FOOD TECHNOLOGY ABSTRACTS

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1 Bolaffi (A) and Lulay (D). The food service industry. Continuing into the future with an old friend. Food Technology 43(9); 1989; 258-260, 262-266

Article covers structure and scope of food service, food technology in food service, meeting the push-pull dynamics of the market place, and future needs. 2 references. SRA

2 Bressani (R). Food science and technology in developing countries during the past 50 years. Food Technology 43(9); 1989; 108-114, 119-132

3 Clydesdale (FM). Present and future of food science and technology in industrialized countries. Food Technology 43(9); 1989; 134-146

4 Figneiredo (AA). Food production and the food industry in Brazil. Their impact on nutritional status. Food Reviews International 5(2); 1989; 237-250

Review. 19 references. SRA

5 Goldblith (SA). 50 years of progress in food science and technology. From art based on experience to technology based on science. Food Technology 43(9); 1989; 88-102, 104, 107, 28

6 Gorgatti-Netto (A). Present and future of food science and technology in developing countries. Food Technology 43(9); 1989; 148-152, 154-168

This articles although focusses present and future of food science and technology of Latin America most of the concepts discussed are applicable to all developing countries. Aspects covered are food and people, food production and technology, food losses and energy waste, education and malnutrition, food research and food availability and future perspectives. 23 references. SRA

7 Haenel (H). Fast foods. Ernahrungsforschung 33(2); 1988; 32-34 (De).

Fast foods (FF) are small, quickly prepared and served and mostly hot meals produced on an industrial scale. FF serve in an increasing degree not only as snacks but also an main meals. They are the results of changes in nutrition behaviour; they are an alternative to conventional catering or to eating at home or in the canteen. In the beginning, the FF-conception with its uniformity and very small var. was oriented towards children and adolescents. Today within the FF-conception variants aimed at a wider range of target-groups, or the application of new operation system gain in importance. Taking into account increased health consciouness the small easily digestible "meal" which is rich in vitamins and helps to control body wt. is considered to be equivalent to traditional dishes. AS

8 Jasol (FSKR). Export prospects of horticultural produce from India. Indian Horticulture 33(4)-34(1); 1989; 79-81, 83, 85

An exhaustive coverage on export of horticultural products from India including the cities from where export is being done; the important commodities exported from each city, season in which the export is done, packaging of commodities, cost and price of export; cargo space and cargo timing; the constraints faced by exporters at Bombay and Trivandrum despatch centres, and the future prospects and the government policy on export of horticultural products. KAR

9 McKay (G), Raymond Murphy (W) and Jodieri-Dabbaghzadeh (S). Settling and fluidisation characteristics of carrot particles in water. Israel Journal of Technology 13(1); 1989; 51-69

The fluidisation and settling characteristics of cylindrical particles have been studied. Relationships have been established using carrots and plastic cylinders, namely PVC and nylon 6:6. Logarithmic plots of fluid velocity versus voidage enabled the min. transportation (terminal) velocity for carrot particles to be determined. Such data are of use to carrot processing plants. At the terminal velocity a resistance coeff. C_r , has been determined and correlated against the sphericity factor, $Phis_5$, by the equation: $\log C_L = 0.77 + 4.75 \log/Phi_5$. In the fluidisation studies a modified Ergum equation was derived relating the friction factor, f_v , to the Reynolds number, RE_{de} and voidage, $\log f_v = 1.44 + 0.53 \log RE/(1-Epsilon)$ settling velocities were determined for the three materials and for different aspect ratios. AS

10 Reineccius (GA). Flavour encapsulation. Food Reviews International 5(2); 1989; 147-176

This review provides a brief description of the flavour encapsulation processes most common or commercially promising in the industry. The discussion covers spray drying, extrusion, molecular inclusion via cyclodextrins, coacervation, fat encapsulation and miscellaneous, processes. 74 references. SRA

FOOD PROCESSING

11 Lund (D). Food processing. From art to engineering. Food Technology 43(9); 1989; 242-244, 246-247

This article highlights some of the food processing advances that will drive this revolution for the food industry. 50 yrs of processing advances, driving forces for new technology, the need for basic knowledge, requirements for advances in food manufacturing (automation, unit operations), and threshold of a revolution are covered. 10 references. SRA

FOOD PACKAGING

12 Dowens (TW). Food packaging in the IFT era. Five decades of unprecedented growth and change. Food Technology 43(9); 1989; 228-240

This article reviews packaging from historical view point, major catagories of packaging materials, and examine how packages and packaging have changes during the 50 yrs of existance of the Institute of Food Technologists. Also covered business and marketing strategies, revolution and the environment, education and professional developments. 13 references. SRA

13 Laad (UD). Open top sanitary can - a versatile container. Indian Food Packer 43(6); 1989; 29-32

The advantage of open top sanitary (OTS) cans, its manufacturing process, and superior packaging properties are described in this general article. VKR

FOOD ENGINEERING AND EQUIPMENT

14 Chase (D). The smart network. Food 11(6); 1989; 33-37

The usage of automation techniques in food industry is discussed. The effect of computers on food industry in coming yrs is also discussed. SYR

15 Gupta (NK). Automation in flour mills. A perspective. Indian Miller 20(1); 1989; 46-50, 52-53

Automation of flour mills could be basically effected by (i) dedicated processors, (ii) computers, and (iii) programmable logical controllers (PLC). The PLC role is reviewed covering the memory size, problems arising from interfacing PLC system to a host computer, customers support and the capability of PLC's in start up and shut down procedure. It is concluded that the use of PLC's and associated systems can, in the long run, help save a considerable amount by increasing overall efficiency and production rates and quality improvement. KAR

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

Chemistry

16 Donnelly (JK), McLellan (KM), Walker (JL) and Robinson (DS). Superoxide dismutases in foods. A review. Food Chemistry 33(4): 1989; 243-270

In this paper the role of superoxide dismutases(SOD) in foods have been reviewed. This covers formation of superoxide and its reactivity in biological systems; superoxide in biological systems. The role of superoxide in production of a more reactive sp. occurence of SOD in foods. Heat stability of SOD in foods; food irradiation and SOD. The biological distribution of SOD (Enzyme types), properties of the metalloforms of SOD; mechanism of enzyme catalysed dismutation; the protective role of SOD in plants; structure of SOD; measurement of SOD. NGKR

17 Fourie (PC) and Basson (DS). Predicting occurrence of rancidity in stored nuts by means of chemical analyses. Lebensmittel-Wissenschaft und-Technologie 22(5); 1989; 251-253

Almond, pecan and macadamia nuts were stored for 16 months at 30 C and a relative humidity of 55%. Rancidity was determined by a trained lab. panel and peroxide and iodine values determined at 2 monthly intervals, starting at 0 months. Specific changes in peroxide values coincided with the onset of rancidity as determined by the taste panel. AS

18 Heinonen (MI), Ollilainen (V), Linkola (EK), Varo (PT) and Koivistoinen (PE). Carotenoids in Finnish foods. Vegetables, fruits, and berries. Journal of Agricultural and Food Chemistry 37(3); 1989; 655-659

This paper describes the results of study of 69 items of fruits, vegetables, berries, mushrooms for their carotenoids analysed by HPLC method. Results showed that lutein and beta-carotene were the predominant carotenoids in all samples except rutabaga, celeriac, mushrooms and raisins. Lutein was highest in green vegetables parsley, celery, dill and spinach (less than or equal to 4400 μ g/100g). Whereas carrot, parsley, dill, spinach, broccolli, leek, celery, sweetned pepper, tomato ketchup and chantarelle were very rich in beta-carotene (1000-7600 μ g/100 g) and thus contribute to vitamin A activity expressed as retionl. A range of alpha-carotene (12-530 μ g/100 g) was present in carrot, bean, sweet yellow pepper, orange mandarin, banana, avacado., cloudberry, raspberry frozen corn, and prune and gamma-carotene was found only in tomato where lycopene was predominant carotene in tomato ketchup. The variations in beta-and alpha-carotene lutein and lycopene was studied in carrot, lettuce, and tomato in market samples. NGKR

Chemistry(Analytical)

19 Baucells (M), Lacort (G), Roura (M), Farre (R) and Lagarda (J). Determination of chromium in foods by flame atomic absorption and inductively coupled plasma spectrometry. Nahrung 33(2); 1989; 225-228 (De).

20 Holder (J) and McCreadie (S). A moving phase. Part 2. Food 11(6); 1989; 41, 43

The article describes briefly about five type of liquid chromatography and their applications in food industry. These include adsorption chromatography, liquid-liquid chromatography, ion-exchange chromatography, affinity chromatography and the HPLC system. SYR

21 Jaeggi (NE), Brunner (R) and Schmidt-Lorenz (W). DEFT-Technique in the analysis of foods. I. Pretreatment and enzymatic digestion. Acta Alimentaria 18(1); 1989; 71-77

For the analysis of foods by the direct epifluorescent filter technique (DEFT) a var. of homogenised foods was rendered filterable by sedimentation, centrifugation and prefiltration through nylon mesh filters. Centrifugation of food suspensions resulted in good clarification but poor microorganisms recovery. A combined sedimentation and prefiltration process yielded good clarification and also good microorganism-recovery. The elimination of food debris was further enhanced by adding enzymes and the surfactant Triton. Protease readily degraded cream, yoghurt, mineral meat and frozen fish, whereas the application of amylase was only partially successful in degrading precooked pasta, frozen peas, patisserie and ground pepper. AS

22 Jaeggi (NE), Brunner (R) and Schmidt-Lorenz (W). DEFT-technique in the analysis of foods. II. Agreement with the standard plate count. Acta Alimentaria 18(1); 1989; 79-88

A var. of foods was analysed by the direct epifluorescent filter technique (DEFT) after attaining filterability through prefiltration and enzymatic digestion. DEFT-counts of pasteurized milk, pasteurized cream, minced meat and frozen fish were in agreement with the results of the standard plate count, whereas correlation was low in precooked pasta, frozen peas, patisserie and canned ravioli. Reasons for low correlations between the two methods are discussed. Variation of the DEFT-count is predominantly caused by the uneven distribution of microorganisms on the membrane filters. A sampling scheme using duplicate filters with 15 counts per filter reduces the standard error of the mean count to below 20%. AS

23 Mirza (ML), Wadood (A) and Shahnaz Bibi. A spectrometric assay procedure for estimation of fructose in presence of glucose. Journal of

the Indian Chemical Society 65(11); 1988; 818-819

A sensitive and accurate method has been developed for estimating fructose in presence of glucose which consists of using 0.5% pyrogallol/0.5% resorcinol in varying concn. of either HCl or phosphoric acid. These reagents made colour complexes with fructose whereas glucose did not produce colour. A micro quantity (30 µ g) of fructose can be estimated if 12 M HCl is used as dehydrating agent. However, the sensitivity is reduced if conc. phosphoric acid is used, where 300 u g fructose can be estimated. KAR

FOOD MICROBIOLOGY AND HYGIENE

Enzymes

24 Fukal (L), Kas (J) and Rauch (P). Immunochemical assays of enzymes in foodstuffs. Food Reviews International 4(2); 1988; 195-209

This paper reviews immunochemical methods used in the field of food science and biotechnology. Covers mutual relation between catalytical activity and immuno-reactivity of enzymes, immunochemical methods in the analysis of cereal and malt enzymes, immunochemical assay of enzymes in beer, immunochemical identification and detn. of rennet proteinases, immunochemical assay of enzymes in milk, immunochemical inspection in industry, immunochemical assay of other enyzmes, immunosorbents in enzymology. 70 references. SRA

25 Turecek (PL), Buxbaum (E) and Pittner (F). Enzymatic quantification of pectins. Chemie Mikrobiologie Technologie der Lebensmittel 12(2); 1989; 39-40 (De).

A two step quantitative assay of pectins using pectin depolymerising enzymes ("pectinase") and L-rhamnose dehydrogenase is described. AS

Fermented foods

26 Chen (T). Past, present, and future of Chinese fermented food products. Food Reviews International 5(2); 1989; 177-208

This paper discusses the historical aspects, the manufacturing technology, and the future outlook on fermented food products in China. 7 references. SRA

Microorganisms

27 Adams (MR), Hartley (AD) and Cox (IJ). Factors affecting the efficacy of washing procedures used in the production of prepared salads. Food Microbiology 6(2); 1989; 69-77

External leaves of whole lettuce were found to have counts approx. 1 log cycle higher than subsequent inner leaf layers. A standard washing in tap water resulted in the removal of an average of 92.4% of the lettuce leaf microflora. Inclusion of 100 Mg l^{-1} (pH c. 9) available free chlorine reduced the count by 97.8%. Adjusting the pH of hypochlorite solutions from 0. 9 to 4.5-5.0 with inorganic or organic acids produced a 1.5-4.0 fold increase in the microbiocidal effect. Increasing the washing time in hypochlorite from 5 to 30 min did not decrease microbial numbers further whereas extended washing in tap water produced a reduction comparable to hypochlorite. Addition of a surfactant, Tween 180, to hypochlorite reduced microbial numbers by 99.6% but resulted in organoleptic differnces. Failure of conventional water and hypochlorite washing to remove more of the microflora is ascribed to the survival of bacteria in protective hydrophobic pockets or folds in the leaf surface and some supportive electron microscopy evidence is presented. AS

8 Jaeggi (NE), Simes (V) Hughest (D). Evaluation of a television image analyser as an aid to estimation of microbial numbers in food using the direct epifluorescent filter technique. Food Microbiology 6(2); 1989; 85-91

Seventy food samples (23 samples of raw milk, 24 samples of minced meat and 23 samples of unsalted butter) were examined using the direct epifluorescent filter technique (DEFT). For each sample, microorganisms captured on duplicate filters were counted both by eye and with the aid of Bio-Foss 40 -10 image analyser. Each count was performed by two operators. The correlation coeff. for the image analyser counts against the manual DEFT count for the 3 products ranged from 0.94 to 0.98. An analysis of variance indicated that both counting methods were equivalent in their repeatability. Operator experience and the quality of the microscopic image were important factors in determining the accuracy of the automatic count. AS

9 Meyer (RS), Grant (MA), Luedecke (LO) and Leung (HK). Effects of pH and water activity on microbiological stability of salad dressing. Journal of Food Protection 52(7); 1989; 4[illegible]-479

The water activity and pH of an exp. starch-based salad dressing were varied to evaluate inhibitory effects on microorganisms selected from groups known to be principal dressing spoilage agents. Dressing samples were inoculated with Lactobacillus fructivorans, Zygosaccharomyces bailii, or a yeast isolated from spoiled commercial salad dressing. Both yeast and L. fructivorans displayed a min. growth pH of approx. 3.55 to 3.60. The min. water activity observed was 0.89 for yeast growth and 0.91 for L. fructivorans. Combinations of water activity and pH which imparted microbial stability without use of preservatives are described. AS

0 Peterkin (PI), Conley (D), Foster (R), Lachapelle (G), Milling (M), Purvis (U), Sharpe (AN) and Malcolm (S). A comparative study of total coliform recovery from foods by most probable number and hydrophobic grid membrane filter methods. Food Microbiology 6(2); 1989; 79-84

A comparative study of the most probable number and the hydrophobic grid membrane filter methods for the recovery of tota coliforms in foods was carried out by five Health Protection Branc lab. A total of 47 samples of food, consisting of 172 sample units was analyzed by the two methods. The study shows that in general th methods are not significantly different, but that in some situation the hydrophobic grid membrane filter method yields higher colifro counts in foods. AS

Alage

31 Chamorro (GA) and Salazar (M). Dominant lethal assay of Spirulin maxima in male CD-1 mice after short term and prolonged-term feeding Journal of Food Protection 52(2); 1989; 125-127

Feeding spirulina alage at 10, 20 or 30% levels to adult CD- mice ror 5 days or 10 wks, followed by mating did not affect pre-implantation losses, and non living implants failed to reveal dominant lethal effects. CTD

Dunaliella bardawil

32 Mokady (S), Abramovici (A) and Cogan (U). The safety evaluation of Dunallella bardawil as a potential food supplement. Food and Chemical Toxicology 27(4); 1989; 221-226

This paper presents results of study with rats raised on diets containing dehydrated alga Dunaliella as dietary supplement. Algae D. bardawil grown in sea water was harvested by centrifugation and drum dried. This algae used in feeding tests were analysed for minerals nucleic acids, heavy metals and beta carotene and the safety of this alga for food use was evaluated by raising four generations on diets containing 0, 5 or 10% dehydrated material. Each group comprised 10 males and 20 females. No significant differences were observed between rates consuming algae and the controls of any generation in general appearance, behaviour growth, reproductive performance or gross pathology. No appreciable differences between the experimental and control animals and the only difference in this pathology observed was decrease in chronic inflammation and an increased frequency of focal bronchoprenmonia in rats fed 10% algae compared to controls. This showed the safety of D. bardawil for human consumption. NGKR

Fungi

Mushrooms

33 Albisu (I), King (RD) and Kozlov (IA). Inhibition of the catecholase activity of mushroom tyrosinase by carbon monoxide. Journal of Agricultural and Food Chemistry 37(3); 1989; 775-776

This work was undertaken to investigate the effect of carbon monoxide on mushroom tyrosinase activity. The catecholase activity of tyrosinase extracted from freeze dried mushroom powder was found to be reversibly inhibited by carbon monoxide. Dissociation of the carbon monoxide-enzyme complex was followed at various pHs between 4.0 and 8.0. The minimum value of the first order rate constant for this reaction coincides with the pH of the max. catecholase activity pH 6.5. Carbon monoxide treatment of the enzyme extracts prevented the self inactivation of the enzyme. NGKR

Hygiene

Bacteria

Lee (RM) and Hartman (PA). Optimal pyruvate concentration for the recovery of coliforms from foods and water. Journal of Food Protection 52(2); 1989; 119-121

Recoveries of coliforms in water and food samples were increased by adding sodium pyruvate to the Tryptic Soy Agar (TSA) base layer, and Violet Red Bile (VRBA) overlay, of the Modified VRBA procedure described in Standard Methods for the Examination of Dairy Products. Six pyruvate levels (0, 0.005, 0.01, 0.05, 0.1 and 1.0%) were tested. Counts were significantly lower (P less than or equal to 0.05) on media containing 0% and 1.0% pyruvate than on the other media. Although 0.05% yielded the highest counts overall, there were no significant differences (P less than or equal to 0.05) among 0.005, 0.01, 0.05, and 0.1% pyruvate. Analysis by using a general linear model procedure revealed that 0.02% pyruvate was the statistically predicted optimal level to use in the Modified VRBA procedure. AS

Escherichia coli

Romick (TL), Lindsay (JA) and Busta (FF). Evaluation of a visual DNA probe for enterotoxigenic, E. coli detection in foods and wastewater by colony hybridization. Journal of Food Protection 52(7); 1989; 466-470

A visual DNA probe for the detection of enterotoxigenic E. coli (LT EEC) by colony hybridization was evaluated to determine its efficacy as a more restrictive, routine indicator method for foods and wastewater. The E. coli heat labile enterotoxin (LT) gene was used as the DNA probe to detect LTEEC. In control experiments the reliability of the probe was demonstrated with food spiked with LT EEC. Raw oysters and wastewater examined for naturally occurring LT EEC showed significant levels of probe positive isolates. Despite some problems, for example background noise associated with food type, the DNA probe proved satisfactory as a method for indicating the presence of enterotoxigenic Enterobacteriaceae. AS

Listeria

Farber (JM), Sanders (GW) and Johnston (MA). A survey of various foods for the presence of Listeria species. Journal of Food Protection 52(2); 1989; 456-458

Various retail foods were analyzed for the presence of Listeria spp. One hundred ten samples of vegetables including lettuce, celery, tomatoes, and radishes, and 14 samples of pasteurized milk, were found to be free of L. monocytogenes. In contrast 9 of 16 (56.3%) chicken legs, 38 of 44 (86.4%) ground meats, and 6 of 30 (20%) fermented sausages contained the organism. Of 530 samples of ice-cream products obtained at the manufacturing levels, only 2 were positive for L. monocytogenes. AS

Pseudomonas

37 . Freedman (DJ), Kondo (JK) and Willrett (DL). Antagonism of foodborne bacteria by Pseudomonas spp. A possible role for iron. Journal of Food Protection 52(7); 1989; 484-489, 495

Antagonistic action of Pseudomonas spp. against foodborne spoilage and pathogenic bacteria was studied to determine mechanisms involved in the establishment of dominance by these organisms in food systems. Thirteen Pseudomonas strains from plant and food origin were tested for the ability to inhibit other Pseudomonas spp. on brain heart infusion agar using a bacteriocin screening assay. P. aeruginosa AA was the most active, inhibiting P. phaseolicola, P. pisi, P. putida, P. fluorescens and P. fragi strains. When testing for antagonism against non-pseudomonads, four Pseudomonas spp. showed wide spectrum activity against a var. of gram positive and gram negative bacteria. Growth of most Pseudomonas spp. on an iron-deficient medium increased antagonism. In assays conducted in liquid media, inhibitory activity varied greatly as a result of the comp. of the media. A minimal media extract from a P. aeruginosa AA culture significantly inhibited the growth of P. fluorescens and Staphylococcus aureus in milk. AS

Salmonella

38 Nath (EJ), Neidert (E) and Randall (CJ). Evaluation of enrichment protocols for the 1-2 Test^{TM} for Salmonella detection in naturally contaminated foods and feeds. Journal of Food Protection 52(7); 1989; 498-499

The 1-2 test^{TM} system was used to detect Salmonella in naturally contaminated foods and feeds. The results were compared with the official Canadian Wet Culture Method. In Phase I, the analytical procedure used for the 1-2 test^{TM} was that suggested by the manufacturer. For both methods, 196 food and feed samples were analyzed. Thirty-four samples were found positive by the Wet Culture Method but only 26 were found positive by the 1-2 test^{TM} an enrichment stage using tetrathionate brilliant green broth. Of the 314 samples analyzed, 84 samples were found to be positive. There were 79 samples found positive by both methods. In the remaining were positives, 3 tested positive only by the 1-2 test^{TM}, and 2 tested positive only by the Wet Culture Method. The majority of positive samples in Phase II were animal feeds. The selective enrichment modification to the 1-2 test^{TM} procedure has enhanced its reliability for Salmonella detection in foods and feeds. The manufacturer's current procedure specifies a selective enrichment step. AS

BIOTECHNOLOGY

39 Harlander (S). Food biotechnology. Yesterday, today and tomorrow. Food Technology 43(9); 1989; 196-202, 206

This article will explore the potential implications of biotechnology for the food processing industry. It includes a brief history of this revolutionary new science, a discussion of research currently in progress, and a look at how food biotechnology could be used in the next 50 yrs to meet the demands of the consumer driven market place. 20 references. SRA

TISSUE CULTURE

Nil

FOOD ADDITIVES

Nil

CEREALS

40 Chen (C), Chiang (YP) and Pomeranz (Y). Image analysis and characterisation of cereal grains with laser range finder and camera contour extractor. Cereal Chemistry 66(6); 1989; 466-470

An image analysis system with the capability to acquire and combine three- dimensional laser range data and two- dimensional camera contour extracted images was used to discriminate between cereal grains and weed seeds and between soft white and club wheats, two- and six- rowed barleys, and rye and triticale kernels. Discriminant functions were established to discriminate between wheat and non-wheat with 99.5% accuracy and between non-wheat and wheat with 98.3% accuracy. The discrimination between two soft white and two club wheats was about 90% accurate. The discrimination between two- and six- rowed barley was about 90% accurate, between barley and other grains 97% accurate, and between rye triticale, and other grains 90% accurate. Discrimination between wheat, soybeans, oats, wild oats, dent corn, flint corn, wild buckwheat, sorghum, and lamb's quarter was almost 100% accurate. AS

41 De Buckle (TS). Composite flours. Prospects for their application in developing countries - The case of the Andean pact countries. Food Reviews International 4(2); 1988; 237-267

42 Fellers (DA) and Bean (MM). Composite flours. Food Reviews International 4(2); 1988; 213-235

Aspects covered include wheat import habit, FAO composite flour program, composite flours in the developed world, case-study of traditional macaroni in the United States, wheat situation in developing countries, and problems in implementing a national composite flour programme. 34 references. SRA

43 Lawton (JW) and Faubion (JM). Measuring kernel hardness using the tangential abrasive dehulling device. Cereal Chemistry 66(6); 1989; 519-524

A test is described that uses the Tangential Abrasive Dehulling Device (TADD) to measure grain hardness. Percent kernel wt. loss during milling follows a first-order decay model. The rate constant from the model is used as a measure of kernel hardness. The rate constant was shown to discriminate kernel hardness in sorghum, wheat, and corn samples. Kernel moisture above 12.5% was shown to raise the rate constant significantly; however, this effect could be reversed by drying the grain before testing. Kernel size also raised the rate constant, but this effect was significant only for very small kernels. AS

44 Lehrfeld (J). HPLC analysis of phytic acid on a pH stable, macroporous polymer column. Cereal Chemistry 66(6); 1989; 510-515

A procedure was developed that enables up to 60 samples containing phytic acid to be analyzed in one day. Extraction time was reduced to 1-3 min per sample by using ultrasonic irradiation. Concn. of the extract was simplified by using a commercially available silica-based, anion-exchange column. High-performance liquid chromatography analysis of the concentrated sample on a macroporous polymer column was accomplished in 8 min. The column easily resolved mixtures containing inositol hexaphosphate, inositol pentaphosphate, and inositol tetraphosphate. Samples of wheat bran as small as 50 mg were analyzed by this system. AS

45 Moran (P) and Westgate (GR). A pneumatic static pressure transducer for cereal grains. Journal of Agricultural Engineering Research 40(4); 1988; 237-244

A pneumatic transducer has been designed for measuring the static stress imposed by cereal grain on full-scale retaining walls. The transducer was intended to be used in positions which are completely inaccessible when a grain store is filled. It is connected to both its air supply and the air pressure measuring instruments by four small-bore air transmission tubes only. The technique for taking stress measurements identifies the null deflection point of the transducer's force balance system and thereby renders measurements free from errors due to local strains in the retained granular material. When fitted with a 106 mm diameter face plate the transducer is capable of measuring stresses of up to 25 KPa to within an estimated standard error of 5%. AS

46 Ng (PKW), Slominski (E), Johnson (WJ) and Bushuk (W). A new perspective on glutenin structure based on fractionation by free-flow preparative isoelectric focusing. Cereal Chemistry 66(6); 1989; 536-537

The free-flow preparative isoelectric focussing technique applied to study the HMW subunits of glutenin from the flour of cv. Neepawa showed several different polymers that have different isoelectric points and hence was possible to fractionate these by isoelectric focussing. The results suggest that the glutenin, in addition to polymeric molecules comprising different numbers and different types of subunits, some HMW proteins exist in flour in single polypeptide form. AR

Barley

47 Aman (P), Graham (H) and Tilly (A-C). Content and solubility of mixed-linked (1-3), (1-4)- beta-D-glucan in barley and oats during kernel development and storage. Journal of Cereal Science 10(1); 1989; 45-50

The concn. of mixed linked (1-3), (1-4)-beta-D-glucan (mixed linked beta-glucan) increased during kernel development of two-rowed and six-rowed barley, with a levelling off or decrease at later stages of maturity. Consequently, the stage of development as well as cvs and growing conditions influenced total mixed linked beta-glucan content. In barley and oat kernels, dry matter was largely deposited before the majorty of mixed linked beta-glucan in the endosperm cells walls was synthesized. High contents of soluble mixed-linked beta-glucan as well as high mixed-linked beta-glucan solubilities were observed before harvest. Close to harvest and early during subsequent storage significant decreases in total and soluble mixed linked beta-glucan contents were apparent. During the remainder of the 6 month storage time studied, however, the contents of soluble and insoluble mixed-linked beta-glucan remained constant, indicating no activity of endogenous mixed-linked beta-glucan degrading enzymes. AS

48 Franconi (J-M), Naulet (N) and Martin (G-J). Natural factors of site-specific isotope fractionation of hydrogen in the fermentation products (ethanol and water) of barley. Journal of Cereal Science 10(1); 1989; 69-80

The influence of environmental conditions on the isotopic fractionation of hydrogen which occurs in the course of the development of cereals has been investigated using barley as a model. The site-specific deuterium contents of ethanol and water resulting from the fermentation of barley are reliable probes for the isotopic content of barley starch. It was shown that the isotopic parameters of the fermentation medium are independent of the state of the raw material and its conversion to ethanol. The differences in the results corresponding to fermentation of grains or malts or to conventional brewing are explained on the basis of variations in the isotopic ratio in the starting water or in the initial concn. of sugars. In most cases no significant influence of the specific barley var was detected, However, some deuterium depletion was observed for the spring var. as compared to the winter var. Although there was no geographical effect (within the limited climatic range of the sites used), there was significant year-to-year variation in the isotopic ratios. There effects are rationalized on the basis of the meteorological conditions, characterized in particular by temp. and precipitation parameters. This study has confirmed that the site specific natural isotope ratios provide powerful analytical criteria for the characterization of cereals and of their derived products. AS

49 Henry (RJ). Factors influencing the rate of modification of barleys during malting. Journal of Cereal Science 10(1); 1989; 51-59

The modification of samples of 41 different barley var. was assessed by staining with Calcofluor following steeping and 48 h of germination. Endosperm modification at this stage varied from 10.3 to 56.2%. Modification was related significantly to alpha-amylase and especially beta-glucanase levels in the partly malted barley but not to grain size or protein content. Variation in beta-glucanase levels explained half the observed variation in modification. However, alpha-amylase and beta-glucanase levels were closely correlated (r = 0.93). High beta-glucan barleys modified less completely, a smaller proportion but a higher absolute amount of their beta-glucan being degraded. Small grained barley produced relatively higher concn. of hydrolytic enzymes but did not necessarily exhibit greater modification at this stage. The positive correlation of high beta-glucanase and low beta-glucan content with modification suggested that these factors may determine the rate of modification. However, some samples especially those with small grains, modified less than would be expected from their beta-glucanase and beta-glucan contents, suggesting a role for other factors possibly related to endosperm structure. AS

Oats

50 Shea Miller (S), Fulcher (RG) and Altosaar (I). Evaluation of 4-methylumbelliferyl heptanoate as a substrate for oat lipase. Journal of Cereal Science 10(1); 1989; 61-68

The fluorogenic substrate 4-methylumbelliferyl heptanoate (MUH) has been reported to be suitable for measurement of lipase activity in cereal grains. In the present study, MUH hydrolysis was compared with a conventional lipase assay which measured the release of free fatty acids (FFA) from endogenous substrates in oats. Correlations of release of free fat r= 0.83 and r = 0.94 were domonstrated between the two assays during heat treatment to inactivate hydrolases. A correlation of r = 0.71 was observed between the two assays in a survey of 21 domestic cvs of mature, ungerminated oats. However, the range of activities for the two assays was different. A fivefold variation in lipase activity, and a twofold variation in MUH hydrolysis were noted. Incorporation of the esterase inhibitor di-isopropylfluorophosphate (DFP) into the reaction mixtures indicated that the MUH assay was measuring primarily esterase activity. It was concluded that the MUH assay is not a valid measure of lipase activity in oats. AS

Rice

51 Bajaj (M) and Sindhu (JS). Extended milling of Indian rice. II. Effect of cooking and sensory quality characteristics. Chemie Mikrobiologie Technologie der Lebensmittel 12(2); 1989; 46-51

The cooking and sensory quality of five promising varietal lines and one var. of rice of 1982 crop, as affected by extended milling was carried out. A significant reduction time in cooking time of milled rice in comparison with brown rice was observed. Elongation ratio, water uptake ratio and gruel solids loss increased significantly, when the brown rice was subjected to extended milling. The coeff. of correlation of degree of polish with water uptake ratio, elongation ratio and gruel solids loss were statistically highly significant and ranged from +0.88 to +0.99, +0.88 to +0.98 and +0.91 to +0.99, resp. Punjab Basmati No. 1 rice had the best cooking and sensory quality as it cooked individual kernels with max. elongation ratio, which increased significantly with extended milling. AS

52 Capanzana (MV) and Malleshi (NG). Studies on malting of rice. ASEAN Food Journal 4(3); 1989; 111-115

Ungerminated control rice had a negligible level of alpha-amylase activity whereas germination resulted in the development of a considerable amount of activity, attaining a peak on the 5th day of germination. However, dry matter loss increased as germination progressed. Malted rice had slightly lower levels of protein and ether extractives and was softer than the ungerminated control sample. Kilning the 3-day germinated green malt at 70 C for about 60 min in a coffee roaster and dehusking the kilned malt in a rubber roller sheller gave malt of desirable flavour and taste. The malt flour had very low cooked paste viscosity as compared to ungerminated, expanded, puffed and flaked rice flours indicating its suitability for use as a base material in low dietary bulk weaning foods. SRA

53 Chandrasekhar (PR) and Chattopadhyay (PK). Heat transfer during fluidized bed puffing of rice grains. Journal of Food Processing and Preservation 11(2); 1989; 147-157

In this investigation the development of pneumatic rice puffing machine for increasing the production capacity of puffed rice and the knowledge of the heat transfer process during process have been described. Experiments have been carried out to determine the physical properties of the rice grains and other fludization parameters necessary for this study. The results showed the surface heat transfer coeff. in case of hot air fluidized bed puffing to be 155.39 w/m^2 K and the calculated grain surface temp. for puffing to be about 170 C which did not vary significantly for experimental puffing air temp. range of 200-270 C. The optimum conditions for higher expansion ratio (8.5 to 10) and better colour of the product, were air temp. ranging from 240 to 270 C with exposure time of 9.7 S to 7 S. NGKR

54 Majaj (M), Arora (CL), Chhibba (IM) and Sindhu (JS). Extended milling of Indian rice. III. Effect of mineral composition. Chemie Mikrobiologie Technologie der Lebensmittel 12(2); 1989; 58-60

The loss of minerals during extended milling of four important varietal lines and one var. of Indian rice is reported in this paper. The loss of P, K, Ca, and Mg during extended milling ranged from 53 to 71, 50 to 74, 57 to 96, and 62 to 96%, whereas that of Zn, Cu, Fe, Mn and B ranged from 43 to 58, 11 to 30, 39 to 57, 33 to 59, and 33 to 58%, resp. Rice contained significant quantities of these minerals, particularly P, K, Mg, Cu, and Mn, even in the white polished form. AS

55 Reyes (VGJr) and Jindal (VK). Conduction heating of high moisture rough rice. III. Changes in milling and cooking qualities. Journal of Food Processing and Preservation 11(2); 1989; 103-105

In this investigation the changes in head yields, whiteness and cooking qualities of rice due to conduction heating carried out for fungal inactivation have been studied. This rough rice had moisture range 18-30% wet basis. The results revealed an increase in head rice yields of heat treated samples accompained by a reduction in milled rice whiteness and improvement in cooked rice texture. Heat treatments of rough rice corresponding to fungal inactivation level of 9.5% resulted in highest head rice yields and acceptable level of reduction in the whiteness of milled rice. The changes in cooking quality were similar to the changes observed in rough fresh rice due to natural aging. NGKR

Wheat

56 Dachkevitch (T) and Autran (J-C). Prediction of baking quality of bread wheats in breeding programs by size-exclusion high performance liquid chromatography. Cereal Chemistry 66(6); 1989; 448-456

Size exclusion high performance liquid chromatography (SE-HPLC) was employed to analyse the unreduced protein extracts for assessing the baking quality of bread wheat genotypes which has great potential in breeding programs. A large number of expt. based on this method for assessing the baking quality showed that the best indicators of the potential baking strength of the genotypes were generally % F_1 or F_1 , F_2 ratios. But the loaf vol. in French baking technology was mostly related to the F_2 fraction. Nevertheless the prediction equation of baking strength must be calibrated from samples of each new crop year. AR

57 Irving (DW), Folcher (RG), Bean (MM) and Saunders (RM). Differentiation of wheat based on fluorescence, hardness, and protein. Cereal Chemistry 66(6); 1989; 471-477

Fluorescence intensity, hardness, and protein data on whole wheat flours were analyzed using a discriminant function to classify wheats. Six classes and subclasses of wheat were represented in a set of 77 samples. When red wheats and durum were considered, a high correlation (r = -0.907) between hardness and fluorescence was obtained; when white wheats were included, the correlation dropped (r = -0.05). Discriminant analysis allowed separation of wheat into proper classes for 100% of durum, hard red spring, club, soft red winter, and soft white winter wheats; and for 94% of hard red winter wheat. AS

Wheat bran

58 Feng (Y) and McDonald (CE). Comparison of flavonoids in bran of four classes of wheat. Cereal Chemistry 66(6); 1989; 516-518

Flavonoids from bran of hard red spring, hard red winter, durum, and white wheats were extracted with diluted NaOH solution (pH 11). They were purified by chromatography on Amberlite XAD-2 resin and A Sephadex G-15 column followed by paper chromatography with two different solvents. The properties of the hard red winter, durum, and white wheat flavonoids were identical in chromatography R values, ultraviolet spectra, and fluorescent colour to those of Len, a variety of hard red spring wheat in which the flavonoid was earlier purified and identified as 6, 8-di-C-glycosylapigenins. Finally, after partly purifying on the Amberlite XAD-2 column, the flavonoid contents of nine wheat varieties were measured by ultraviolet spectrometry at 405 nm. AS

Wheat flour

59 Finney (KF). A five-gram mixograph to determine and predict functional properties of wheat flours. Cereal Chemistry 66(6); 1989; 527-530

Described is a 5-g mixograph to determine and predict functional properties of wheat flours. Mixograms from the 5- and 10-g instruments were entirely comparable and high replicable. A mixogram time-to-peak difference of 0.276 min between any two single values is required for significance at $p = 0.05$. The 5-g instrument has several structural improvements not on previous 10-g models. Mixograms of flours representing a wide range in mixing time to peak and in protein content were comparable for the 5- and 10-g instruments. AS

60 Horvath-Almassy (K). Investigation of the additivity of flour characteristics in two-component wheat flour mixtures. Acta Alimentaria 18(1); 1989; 19-30

Baking quality, pastry and protein properties of two-component wheat flour mixtures were tested in model exp. The four basic flour samples comprised a wide range, almost three orders of baking quality (Jubilejnaja 50, MV 8, Baranjka and GK Csilla of the yr 1986). It was established that some of the characteristics additioned in the course of mixture means a high correlation between the properties as measured or calculated on basis of comp. Properties studied were:

water absorption capacity, valorigraph value, SDS sedimentation value. However, other properties (loaf vol., largest cross-section), important from the point of view of the final product, did not prove additive at all. Results corresponded highly with the experiences of Bolling (1980). The exp. permit the conclusion that the rheological properties of the pastry or the gluten of individual flours highly affect the baking quality of the mixture obtained from them. The mixture of a flour producing short, firm texture and another containing softened gluten may give a loaf of optimal vol. although the quality of the two flours is far from optimal. The results point to the importance of the rheological properties of wheat true to var. for the baking industry. The deliberate utilization of the combinative capacity of different flours may improve the economicalness of the milling and baking industries while simultaneously satisfying the requirements of the consumer. AS

Wheat proteins

61 Gabor (E). Determination of wheat protein by a new spectrophotometric method. Acta Alimentaria 18(1); 1989; 31-35

A new spectrophotometric method was elaborated to determine the protein content of wheat. The principle of the method is based on the light absorption of the protein solution, which is proportional to the protein quality present. The examined material was digested with formic acid at 100 plus or minus 1 C for 60 min. After cooling, ethanol and methylene chloride were added to the reaction mixture. The spectrophotometric solution was made from this suspension by adding formic acid to it. The non-dissolved bran residues were filtered off before measurement of the optical density of the solution. Calibration measurements were carried out by means of the Kjeldahl method for the calculation of protein content. Mathematical evaluation demonstrated the good aplicability of the spectrophotometric method. AS

Gliadins

62 Lukow (OM), Dyck (PL) and Bushuk (W). Possible linkage of falling number value with gliadin proteins in wheats with genes for improved sprouting resistance. Cereal Chemistry 66(6); 1989; 531-534

The gliadin electrophoregrams of each of the 93 random lines of the parcut wheat RL 4137 and the cv. Neepawa, which have high resistance to preharvest sprouting; showed four distinct protein banding patterns. A possible linkage between the high mobility gliadin bands and the falling number values (FN) was indicated. However, prescreening of early sensation lines for these bands and also determining the FN values of the selected lines increases. The efficiency of the selection of lines of improved sprout resistance. AR

Glutens

63 Wadhawan (CK) and Bushuk (W). Studies on vitality of commercial gluten. Part 1. Physical, chemical and technological characteris-

tics. Cereal Chemistry 66(6); 1989; 456-461

Twenty-seven samples of commercial vital gluten were subjected to various physical, chemical, and technological tests in an attempt to develop a rapid, simple test of vitality for breadmaking purposes. Coeff. of correlation were calculated between test parameters and vitality as measured by the baking test. Of the compositional parameters, sodium content and the ratio of bound lipid to free lipid were significantly positively correlated to vitality of gluten. Of the physical characteristics, force required to stretch a sample of wet gluten was highly significantly correlated with vitality. AS

64 Wadhawan (CK) and Bushuk (W). Studies on vitality of commercial gluten. Part II. Solubility, fractionation, electrophoresis, and fluorescence results. Cereal Chemistry 66(6); 1989; 461-466

Osborne solubility fractionation of commercial vital glutens showed that samples containing more insoluble residue protein gave poorer baking performance (i.e., lower vitality). Devitalized glutens prepared by heating at elevated temp. contained the greatest amount of insoluble residue. The proportion of acetic acid soluble protein was directly correlated to vitality of gluten. Electrophoresis patterns were altered upon devitalization. Intrinsic fluorescence of dry gluten increased upon devitalization; vitality was highly significantly negatively correlated to the intrinsic fluorescence value. Fluorescence of solution of acetic acid soluble fractions of vital gluten was high significantly correlated with vitality as measured by the baking test. AS

Wheat starch

65 Ellis (HS), Ring (SG) and Whittam (MA). A comparison of the viscous behaviour of wheat and maize starch pastes. Journal of Cereal Science 10(1); 1989; 33-44

The viscous behaviour of aqueous suspensions of gelatinised starch granules from wheat and maize has been investigated. The viscosity of the suspension relative to that of water is dependent on the vol. fraction occupied by the particles, their shape and deformability. The swelling and deformability of gelatinised wheat starch granules show a strong dependence on the heating rate employed to gelatinise the starch. For gelatinised starch pastes of wheat and maize it has also been shown that the solubilised polysaccharides make a contribution to the observed viscosity. AS

MILLETS

Corn

66 Singh (G). Pre-production development and fabrication techniques of tubular maize shellers. Journal of Agricultural Engineering 25(2); 1988; 107-114

An attempt has been made to modify the design of a tubular maize sheller to suit batch production techniques. Design of simple jigs and fixtures has also been described. These fabrication aids reduced the layout and dimensioning time considerably thereby increased vol. of production. The investment in jigs and fixtures was possible to recover in 120 units of tubular maize shellers. AS

67 Zayas (JF) and Lin (CS). Frankfurters supplemented with corn germ protein. Sensory characteristics, proximate analysis and amino acid composition. Journal of Food Quality 11(6); 1989; 461-474

Defatted corn germ protein (CGP) has been studied as a functional or substitute ingredient of frankfurters. The proximate composition (protein, fat, moisture, ash) and amino acid content of hexane- and supercritical corbon dioxide defatted CGP and frankfurters contaning CGP were determined. CGP was incorporated in frankfurters as in a powder, slurry form and as a stabilizer of emulsions. Proximate analysis showed significantly lower fat content of CGP processed by a modified procedure and a reduction of fat content in meats containing CGP. Levels of essential amino acid in CGP cmpared favorably to those in sodium caseinate, hen's egg protein, and soybean protein. Except for isoleucine, CGP meets or exceeds a FAO provisional amino acid pattern recommended for human consumption. No significant differences were found in amino acid comparision of hexane- or supercritical-carbon dioxided-defatted CGP. Amino acid comp. of frankfurters was not greatly altered by the addition of CGP at the level studied. An acceptable, weak corny aroma and taste could be detected at 2.4 and 3.5% levels of added CGP. Defatted CGP with its high protein content and amino acid pattern combined with relatively low cost has potential as an extender, fortifier, and binding agent in frankfurters and other comminuted meats. AS

Corn proteins

Glutens

68 Hardwick (JE) and Glatz (CE). Enzymatic hydrolysis of corn gluten meal. Journal of Agricultural and Food Chemistry 37(4); 1989; 1188-1192

In this study the kinetics of enzymatic hydrolysis of corn gluten meal have been presented. For this purpose the corn gluten meal was hydrolysed with Alcalase 2.4 L, an alkaline protease and the effects of enzyme concn. and gluten size reduction on the hydrolysis were studied. The extent of reaction was expressed in terms of both the degree of hydrolysis and the concn. of soluble protein (using the pH-stat technique). The models describe the time-dependent behaviour of three protein/peptide pools-insoluble protein TCA-insoluble proteins, and TCA-soluble peptides. A simplified product inhibition model was seen to give the best bit to the experimental data. NGKR

Lentils

69 Waczkowski (W), Sosulski (FW) and Hoover (R). Efficiencies of solvent systems for extraction of legume lipids. FAT Science and Technology 91(6); 1989; 233-236

Ten different solvent systems of variable polarity were used to extract total lipids from lentil flour and legume starches. Fractionation of the purified flour lipids showed that propanol/water extracted phospholipids and glycolipids quite efficiently but chloroform/methanol and benzene/ethanol gave high recoveries of both non-polar and polar lipids. N

Sorghum

70 Collins (JL), Draughon (FA) and Mccarty (IE). Destruction of microorganisms and deformation of plastic jars by hot sorghum syrup. Journal of Food Quality 11(6); 1989; 433-441

Sweet sorghum syrup was heated at 49 C to 71 C and filled into glass jars of 200 mL capacity that contained each of four microorganisms (Bacillus subtillis; Byssochlamys nivea: Saccharomyces rouxii; and Aspergillus niger) at 0, 1,000 or 10,000 CFU/mL syrup. Counts were determined on syrup immediately after filling into the jars and after four months storage. The heated syrup at all temp. significantly reduced the survival of bacteria and fungi at the time of filling. After four months, no bacteria could be detected in syrup at each temp., and no fungi could be detected at 66 and 71 C. The heat of syrup at 71 C or lower did not cause single layer polypropylene jars to become deformed; however, at 77 C and 82 C deformation occurred such that the jars were unsatisfactory for the packaging of syrup. Therefore, syrup can be filled at 66 C and 71 C into single layer polypropylene jars. At these temp., common spoilage microflora were destroyed or inactivated during storage, and the plastic jars did not become deformed. AS

PULSES

71 Dixon Phillips (R) and Abbey (BW). Composition and flatulence-producing potential of commonly eaten Nigerian and American legumes. Food Chemistry 33(4); 1989; 271-280

In this investigation the flatulence-producing potential of a cross-section of leguminous seeds commonly consumed in West Africa and in USA was measured and compared to their seed comp. Sixteen samples of dry, mature legume seeds representing eight sp. obtained from markets were cooked in boiling water until tender and freeze-dried along with cook water. The flatulence potential was measured as ml hydrogen produced per gram of legume solids consumed with rats housed in glass life-support chambers designed to collect hydrogen while supplying oxygen and then absorbing water and carbon dioxide.

Hydrogen was quantitatively measured by GLC using a molecular sieve column and mono-, di- and oligo saccharides determined by HPLC. Results showed that hydrogen production was positively correlated with xylose, fructose and starchy contents and negatively correlated with galactose and indigestible starch. NGKR

72 Duranti (M) and Giani (D). Proteolytic events in legume storage proteins. Acta Alimentaria 18(1); 1989; 89-96

The most significant proteolytic events which modify the storage proteins of lupin (Lupinus albus L.) seed during development to early stages of germination were investigated. Special emphasis was given to globulin 8, the major legumin like globulin of the seed. The first event considered is the post-translational breakdown of legumin precursor polypeptides (M_r around 70,000) occurring during seed development which gives rise to two polypeptides usually referred to as legumin acidic (40 000 to 50000 M_r) and basic (19 000 M_r) subunits. The second step is the partial proteolysis of the acidic subunits which can be also achieved in vitro by incubation with two endopeptidases from lupin resting seed. The role of this further cleavage is unknown, but it can be related to an altered association-dissociation behaviour of legumin oligomer. At early stages of germination of breakdown was more extensive and again only the acidic subunits appeared to be affected by the enzymatic proteolysis. AS

73 Gathehouse (AMR), Shackley (SJ), Fenton (KA), Bryden (J) and Pusztai (A). Mechanism of seed lectin tolerance by a major insect storage pest of Phaseolus vulgaris, Acanthoscelides obtectus. Journal of the Science of Food and Agriculture 47(3); 1989; 269-280

The bean weevil Acanthoscelides obtectus (Say) is a major storage pest Phaseolus vulgaris L (kidney haricot bean). The seeds of P. vulgaris contain high levels (up to 30 mg g^{-1} DM) of lectin, which has ben shown to be toxic towards larvae of the related bruchid storage pest of cowpea, Callosobruchus maculatus F. The lack of toxicity of this lectin towards larvae of A. obtectus is demonstrated. Unlike the strong binding of lectin to the midgut epithelium observed in larvae of C. maculatus, no binding of lectin molecules was found to occur in the gut epithelial cells of A. obtectus. This observation provides the basis for a hypothesis explaining the lack of toxicity of P. vulgaris lectin towards A. obtectus. Assays of proteolytic activity in gut homogenates of C. maculatus and A. obtectus suggest that the difference in susceptibility of the two insects towards the toxic effects of the lectinis not due to differential inactivation by proteolysis. Besides its effects on larval development, the lectin has a further effect at pupation, causing disruption of adipose tissues in C. maculatus but having no effect on A. obtectus. AS

Broad beans

74 Schreider (C) and Schmandke (H). Preparation of broad bean (Vicia faba L. minor) products. Part 4. Effects of recirculation of waste water on the quality of protein isolates. Nahrung 33(2); 1989; 177-

182

The isolation of proteins from broad bean flour is a water consuming process. The waste water of that consists of the supernatants after the isoelectric precipitation and washing. Different parts of those supernatant were recirculated into the process of protein extraction and isolation. The results show the possibility to recirculate 25% of the supernatant after the isoelectric precipitation and 100% of the supernatant after washing without any effect on the comp. of the protein isolates. AS

Chickpeas

75 Rembold (H), Wallner (P), Nitz (S), Kollmannsberger (H) and Drawert (F). Volatile components of chickpea (Cicer arietinum L.) seed. Journal of Agricultural and Food Chemistry 37(3); 1989; 659-662

This study was carried out to characterise headspace volatile material for identification of chickpea seed samples. (Cicer arietinum L., Fabaceae) indigenous to India, Pakistan, Iran, Ethiopia, Mexico and Mediterranean area. The head space material collected from floured chickpea seeds was analysed by capillary GC-MS spectrometry. It was possible to achieve structural assignment for 132 components of chickpea volatiles by these techniques and all the substances above 0.5% of the total volatiles except two could be identified. The comp. showed terpenoids (35%) and alcohols (18%) besides aliphatic hydrocarbons. By this method a total of 2.4 μ g of volatiles was collected from 1.5 L of head space vol. and the main individual component was found to be alpha-pinene (= 0.3 μ g). NGKR

Cowpeas

76 Akinyele (IO). Effects of traditional methods or processing on the nutrient content and some antinutritional factors in cowpeas (Vigna unguiculata). Food Chemistry 33(4); 1989; 291-299

The results of study on the effect of household preparation methods on the nutritive value of the various cowpea products have been presented in this paper. Cowpea (V. unguiculata) was processed into ewa, akara, moin-moin and gbegiri which are commonly consumed products in Nigeria by traditional methods. The proximate comp. trypsin inhibitor activity, oligosaccharides, phytate, energy values, minerals were analysed in the product by standard methods and stastically analysed. Results showed significant variation from each other in moisture and lipid content. The processing did not affect the protein but the calorie, ether extract, ash and N free extracts were affected by the method of preparation, wide variation was also found in the mineral contents. Gbegiri had the lowest phytate, oligosaccharides and trypsin inhibitor activity but lowest in nutrients. This showed that the traditional methods are adequate for max. nutritive values and acceptability. NGKR

Pigeon peas

77 Shepherd (H) and Bhardwaj (RK). Moisture-dependent physical properties of pigeon pea. Journal of Agricultural Engineering Research 35(4); 1986; 227-234

A non-linear relationship was observed kernel vol. and moisture content for pigeon pea. The best defined approx. shape was found to be prolate spheroid with an effective diameter of 4.83 mm, mean surface area 67.4 mm^2, 1000 grain wt. of 76 g, and sphericity and roundness about 80% at 14.7% m.c.d.b. In the moisture range 6.3 to 28.2% d.b., the bulk and true densities were found to decrease linearly from 806 to 745 kg/m^3 and 1305 to 1251 kg/,m^3 resp., and porosity decreased linearly with bulk density from 40.4% to 38.2%. The angle of repose increased from 0.38 to 0.44 rad in the moisture range 5.8 to 14.7 d.b. The static coeff. of friction of pigeon pea against a galvanized steel surface increased from 0.26 to 0.37 in the moisture range 6.4 to 28.5%. d.b. AS

OILSEEDS AND NUTS

78 Sattar (A), Jan (M), Ahmad (A), Wahid (M) and Khan (I). Irradiation disinfestation and biochemical quality of dry nuts. Acta Alimentaria 18(1); 1989; 45-52

The effectiveness of radiation disinfestation of Pakistani nuts such as almond, groundnut, pine nut and walnut, was studied. Sp. of insects involved were determined. Concn. of potential nutrients, phytate, total P and Fe contents were determined. Tribolium castaneum and Sitotroga cerealella infested walnut and pine nut while Cadra cautella and Plodia interpunctella affected almond and groundnut, resp. Irradiation dose of 1.0 kGy completely checked infestation of these nuts. Sensory ratings decreased with advanced storage, and samples tested at 0.50 kGy were rated higher than others. Peroxidation rate was higher in pine nut and walnut than almond and groundnut. These nuts widely varied in the contents of potential nutrients such as protein, lipids, mineral matter, fibre and carbohydrates and exhibited wide range values of energy (2533-3102 kJ per 100 g), phytate (274.8-328.5 mg per 100 g), total P (268.5-604.0 mg per 100 g) and Fe (6.6-11.6 mg per 100 g). AS

Almonds

79 Soler (L), Canellas (J) and Saura-Calixto (F). Changes in carbohydrate and protein content and composition of developing almond seeds. Journal of Agricultural and Food Chemistry 37(5); 1989; 1400-1404

In this study the changes in comp. of developing almond are investigated in order to understand the physiological and morphological processes throughout maturation. The changes in moisture content fresh wt. and dry wt. of a kernel as well as water soluble sugars, sugar alcohols, cell wall constituents, protein, total amino acids, and free amino acids were determined in developing almond kernels (Prunus amygdaLus) at 3 wks intervals from March until harvest. It was seen that a sharp drop in sugars from 60 to 56% dry wt.) was observed in a first stage. Reducing sugars were also seen to decrease from initial high percentages to a final trace level. The changes in hemicellulose, cellulose and lignin were also seen to be carbohydrate. source during a period. The protein content increased steadily upto harvest more significantly during a 20 day period. The significant variations were found in amino acid content. The free amino acids were more in developing almonds whereas ripe kernels did contain insignificant amounts. NGKR

Groundnuts

80 Murugesu (V) and Basha (SM). Effect of salt concentration and duration of boiling on peanut seed composition. Journal of Agricultural and Food Chemistry 37(3); 1989; 756-760

The objective of this study was to determine the effects of boiling time and the presence of different concn. of salt during boiling on groundnut seed comp.. For this purpose green peanuts (Arachis hypogaea L. cv. Florunner) were boiled in water containing various amounts of salt (0-5%) for 0-2 h to determine the effect of wet heat on seed comp.. The results showed by boiling a reduction soluble carbohydrates, soluble protein and free amino acids occured whereas there was no change in total protein, insoluble carbohydrates, and oil. The gel filtration and gel electrophoresis data showed the disappearance of major protein and polypeptide entitles which indicated that while total seed protein content is not affected during boiling the protein and polypeptide comp. are greatly altered. NGKR

81 Rodriguez (MM), Basha (SM) and Sanders (TH). Maturity and roasting of peanuts as related to precursors of roasted flavour. Journal of Agricultural and Food Chemistry 37(3); 1989; 760-765

The data on variations in total seed components due to maturity and differential response of groundnut seed of varying maturities to roasting has been presented in this paper. The defatted meals prepared from raw seeds and peanut pastes were analysed for soluble and insoluble carbohydrates alpha-amino nitrogen protein by standard procedures. The results showed that the protein and carbohydrate contents of the raw seeds and pastes were similar but the alpha-amino nitrogen content of the pastes was lower than that in the raw groundnuts. Protein and carbohydrates of the seeds of different maturities responded similarly to roasting but the alpha-amino Nitrogen decreased more (38-55%) in the mature seed than in the immature seed (25-28%). Groundnut pastes contained significantly lower amounts of the 90000, 70000, 50000 and 32000 M. W. polypeptides than the raw groundnuts. NGKR

Groundnut flour

82 Madhavi (DL), Lalitha Subramanyam, Nagin Chand and Srinivasan (KS). Effect of solvent extraction on removal of nutty flavour and functional properties of ground flour. Journal of Food Quality 11(5); 1989; 375-385

Hexane extracted groundnut flour was re-extracted with absolute ethanol, 95% isopropanol, hexane:ethanol and hexane:isopropanol ozeotropes for different time intervals. Sensory evaluation studies indicated that 6 h extraction with ethanol or isopropanol and 24 h extraction with hexane; ethanol azeotrope removed nearly 80-90% of nutty flavour. Some significant changes were observed in water obserption capacity, emulsification capacity and foaming properties of secondary solvent extracted meals. No significant changes were observed in fat obsorption capacity, protein solubility and amino acid composition of secondary extracted samples. Gel electrophoresis did not reveal any marked changes in the protein composition of the reextracted meals. AS

Groundnut proteins

83 Chiou (RY-Y) and Tsai (T-T). Characterization of peanut proteins during roasting as affected by initial moisture content. Journal of Agricultural and Food Chemistry 37(5); 1989; 1377-1381

In these studies the internal temp. changes in peanuts with various moisture contents due to roasting were monitored, N solubility of peanuts subjected to various time/temp. roasting conditions quantitatively studied and physicochemical changes in peanut proteins during roasting and cooking in a water bath were investigated with use of gradient PAGE. Dry peanut kernels were moisture conditioned and their internal temp. profiles roasted at 150 C were monitored. It was seen that the seeds containing higher initial moisture resulted in slow internal temp. increase. The initial moisture also affected denaturation of proteins as seen from the phosphate buffer extracts of proteins from splits roasted to various temp. between 80-150 C. The amount of extracted protein declined with an increase in initial moisture content from 3.2 to 23.2% when the roasting temp. was 140 C. The other PAGE analytical studies also showed that the thermal behaviour of arachins and non-arachins varied depending on the conditions of heating and initial moisture. NGKR

Rapeseeds

84 Finnigan (TJA) and Lewis (MJ). Detoxification of alkaline extract of United Kingdom commercial rapeseed meal by diafiltration. Lebensmittel-Wissenschaft und-Technologie 22(3); 1989; 116-118

Diafiltration was used for the detoxification of alkaline extract of United Kingdom commercial rapeseed meal. A plot of glucosinolate permeate concn. as a function of diavolume suggested that membrane rejection of glucosinolates had reduced the process efficiency. Glucosinolate rejection was estimated from the change in permeate concn. during diafiltration, but did not give an acceptable value. The passage of 3.53 diavolumes produced a retentate with no detectable glucosinolate, but concomitant losses of extracted solids and true protein were high. AS

85 Shahidi (F) and Gabon (JF). Individual glucosinolates in six canola varieties. Journal of Food Quality 11(6); 1989; 421-431

The glucosinolate comp. of canola var. of Altex, Candle, Regent, Tower, Triton and Westar were determined by gas chromatography (GC) and high-performance liquid chromatography (HPLC). Twelve glucosionolates were detected and their identities confirmed by comparison with the retention times of known glucosinolates and by mass spectrometry (MS). The major glucosinolates present in canola meals were gluconapin (3-butenyl), progoitrin (2-hydroxy-3-butenyl), glucobrassicanpin (4-pentenyl), glucobrassicin (3-indolylmethyl) and 4-hydroxyglucobrassicin (4-hydroxy-3-indolylmethyl). Indole glucosinolates were quantified better by HPLC than GC method of analysis. Sulphinyl glucosinolates were determined only by the HPLC methodology due to the yield of multiple peaks by GC. AS

Soybeans

86 Patel (AA) and Gupta (SK). Storage related changes in flavour and certain chemical characteristics of a soy-based spread. Food Chemistry 33(4); 1989; 311-317

This study has been carried out on the flavour acceptability and certain chemical properties of an o/w low fat spread prepared from a soy conc. and vegetable fat during storage under various conditions. Shelf stability of the spread was substantially enhanced by the use of preservatives such as benzoic acid, sorbic acid and potassium sorbate. The results revealed that at 0.1% level was more effective than 0.05% and the spread containing sorbic acid and potassium sorbate retained an acceptable flavour 10 wks at 5 C and no significant difference was noticed between glass jars and tin cans storage. There was correlation between acidity, free fatty acids and non-protein nitrogen and the flavour changes in the product during storage. NGKR

Soy proteins

87 Ross (LF) and Bhatnagar (D). Enzymatic phosphorylation of soybean proteins. Journal of Agricultural and Food Chemistry 37(4); 1989; 841-844

Soybean proteins were enzymatically phosphorylated with the catalytic subunit of cAMP-dependent protein kinase isolated from bovine cardiac muscle. Both of the major storage proteins, beta-conglycinin and glycinin, were phosphorylated. Heat denaturation of the soy proteins increased the amount of Tau- ^{32}P/ incorporation. Soy isolates incorporated up to 0.88 mol of phosphate/mol of beta-conglycinin and over 1.0 mol of phosphate/mol of glycinin. Enzymatic phosphorylation could provide a means of increasing the solubility of soy proteins at mildly acidic pH and thus extend the availability of soy proteins for use in the food system. AS

Sterculia foetida

88 Bhattacharyya (AK) and Mazumdar (BC). Nutritive value of the Sterculia foetida nuts. Science and Culture 55(6); 1989; 220

Sterculia foetida L is a tropical and subtropical tree planted along the avenues. The nuts are edible and it contains 16% protein and 37% total ether extractable lipids. The physical characteristics of the nuts are also mentioned. KAR

Sunflowers

89 Hollo (J), Peredi (J), Borodi (A) and Kovari (J). Production of special quality sunflower meal. FAT Science and Technology 91(6); 1989; 219-224

Sunflower in addition to oil contains good amounts of protein, therefore processing should be such that it should give a good quality of meal. Dehulling is carried out in dehulling drums operating on the principle of beating and/or centrifugation and separation of the hulls and kernels. To minimise loss of oil, the selected hulls are passed through a hall-cleaning device. Good amount of data is given to justify the above finding. N

Sunflower proteins

90 Bulmaga (VP), Lapteva (NA) and Vaintraub (IA). The effect of phytate on the solubility of the sunflower seed proteins. Nahrung 33(2); 1989; 161-165

11S protein of the sunflower seed is precipitated by phytate at pH 2.0, a protein-phytate complex being formed thereby. The number of the phosphate groups bound by the time the precipitation is completed is less than one half of that of the basic groups of the 11S protein. The insolubility of the complex formed interferes with the acid extraction of protein from the sunflower meal and solvent cake. The protein extractability increases sharply after the removal of the phytate. AS

91 Durante (M), Bernardi (R), Lupi (MC) and Sabelli (P). Characterization of Helianthus annuus L. storage proteins. Journal of Agricultural and Food Chemistry 37(4); 1989; 852-855

A rapid method is described for isolating the globulin fraction (helianthinin) of sunflower seeds (Helianthus annuus L.). The protein was characterized by chromatography and electrophoresis and compared with the globulin extracted from protein bodies. The native protein shows an apparent mol. wt. of 300K, but, alternatively, a 190K band is present in some selfed lines of sunflower. Electrophoresis under denaturing conditions evidences four major components with mol. wt. 39.2, 32.5, 25.6, and 23.2K, each containing two polypeptides and some minor polypeptides. In the 190K protein, the 32.9K component is absent. Isoelectric focusing indicated an heterogeneity of subunits within a pI range of 5.0-6.2 as confirmed by two-dimensional electrophoresis. AS

TUBERS AND VEGETABLES

92 Jordy (A). Formation of ethylenechlorhydrine in vegetable products especially in Camomile after fumigation with ethyleneoxide, depending on the water content and the packaging materials. Deutsche Lebensmittel-Rundschau 85(9); 1989; 279-285 (De).

The formation of ethylenechlorhydrine (ECH) during and after the fumigation of camomile with ethyloxide (dosage 500 g EX/m^3, 6 hr) was investigated depending on the water content and the packing material. If the water content was relatively low, the ECH residue continued to rise after the fumigation; in the case of higher water contents, it usually decreased continually immediately after fumigation, irrespective of the packing material. Part of the decrease of the ECH residue is due to desorption, which was identified in N atm. ECH desorbed from camomile during the desorption period is accumulated in paper packing material; this is, however, not the case with PE film. It is remarkable that during and for a short time after fumigation the water content of camomile decrease and thereafter may rise to over 100%. In relatively dry camomile, however, the ECH content increase at first and decreases again later on. AS

Tubers

Potatoes

93 Rai (RD) and Verma (SC). Evaluation of the potato cultivars for chipping. Indian Food Packer 43(6); 1989; 15-19

Potato cv. (Solanum tuberosum) and 5 hybrids were evaluated for chip-making before and after cold storage by assessing the dry matter, reducing sugar contents of the tuber and colour of the fresh fried chips. The potato cv. produced chips of acceptable colour before storage. After 7 months of cold storage (2 plus or minus 1 C) all the cv. accumulated reducing sugars and produced dark brown coloured, unacceptable chips. Post-storage reconditioning of the tubers at ambient temp. (22 plus or minus 2 C) decreased the reducing sugar content and improved the chip colour, but varietal differences were also existed. 'K. Chandramukhi' and 'K. Sindhuri' var. found to be suitable for chip-making after harvest and 2 wk after post storage conditioning. KAR

Sweet potatoes

94 Ghazi (A), Abd-El-Aal (MH) and Khalil (M). Effects of frying and storage at room temperature on the chemical composition and quality of sweet potato slices. Nahrung 33(2); 1989; 153-159

Fried sweet potato slices were prepared from yellow (Mabrouka) and orange (Abees) tubers. Some chemical and organoleptic qualities were studied. Changes in these qualities which occurred during storage for 3 months at room temp. were also investigated. The results obtained led to the following conclusions: 1. sweet potato slices had moderate amounts of Ca and P, and there was no significant differences in mineral content between fresh and fried sweet potato slices. 2. Sweet potato slices contained a fair amount of essential amino acids, especially leucin, valine and lysine, whereas tryptophan and sulphur amino acids were the limiting amino acids. 3. Sliced sweet potato of yellow var. (Mabrouka) dipped in water, then deep fried in cottonseed oil at (180 plus or minus 5) C for 1.25 min was organoleptical proved to be the best compared with those prepared from orange var. (Abees), or of yellow var. but dipped in 1% citric acid. 4. Storage of fried sweet potato slices (Mabrouka) in polyvinyl packages at room temp. led to gradual increase in their moisture content and peroxide value, while carotenoids content decreased. Furthermore, the fried sweet potato slices were acceptable until the 10th wk of storage, then a rancid taste begins to appear. AS

95 Silva (JL), Yazid (M), Ali (M) and Ammerman (GR). Effect of processing method on products made from sweet potato mash. Journal of Food Quality 11(5); 1989; 387-396

Green and cured (seven days at 29 C and 90% RH) 'Centennial' sweet potato roots were used to make and evaluate frozen and canned mashes and canned whole roots. Fried patties and pies were made from each of the processed products. The frozen mash from green roots was higher in pH while the canned mash from green and cured roots was lower in pH and higher in viscosity. The canned mash had the lowest 'L' and 'a' readings but was rated the highest in colour score when made in to pies. However, the fried patties were scored higher in colour when made from frozen mashes or canned whole roots. Moreover, pies made from low viscous mashes were scored low in texture. AS

Vegetables

96 Roy (SK). Post-harvest technology of vegetable crops in India. Indian Horticulture 33(4)-34(1); 1989; 76-77

A brief review dealing about the pre-harvest management of crops and also post harvest operations like packaging; transportation; marketing; storage; and processing of vegetable crops. KAR

97 Siddiqui (IR). Studies on vegetables. Fiber content and chemical composition of ethanol-insoluble and soluble residues. Journal of Agricultural and Food Chemistry 37(3); 1989; 647-650

This paper describes an alternative approach to fiber analysis using ethanol insoluble residues from four Canadian vegetables and also reports on the ethanol soluble lower mol. wt. carbohydrates. Four vegetables were analyzed for moisture, N, starch, lignin, ash, and uronic anhydride. These starch free residues after enzyme hydrolysis were recovered and analysed for neutral sugars following acid hydrolysis and derivitization as alditol acetates by GLC. The results showed from the total of lignin, cellulose, and non-cellulosic polysaccharides the dietary fibre contents of celery, parsnip, rutabaga and squash to be 1.1, 4.7, 2.3 and 2.3% resp. on fresh wt. basis. The ethanol soluble residues showed major amounts of glucose, myoinositol and sucrose. The residue from celery in addition showed higher amounts of malic acid and mannitol. Whereas fructose was absent in all the residues. NGKR

Cauliflowers

98 Ramaswamy (HS) and Ranganna (S). Effect of blanching and sulphite treatment on the quality of frozen cauliflower. Journal of Food Quality 11(6); 1989; 443-452

The influence of blanching time and post-blanching sulphate treatment on the sensory quality and texture of frozen cauliflower were assessed after storage at -18 C for up to one yr. The treated cauliflower florets, sealed in polyethylene bags, were placed in waxed paperboard cartons and frozen in a contact plate freezer at -35 C. Samples blanched for 3 min and dipped in a solution containing 1000 p.p.m. of sulphur dioxide for 5 min gave a significantly ($p<0.05$) superior product even when stored for one yr. The residual sulphur dioxide content of 50 p.p.m. found in these stored samples disappeared after a 3 min cooking in boiling water. Cauliflower texture was influenced by blanching time but the textural differences of blanched samples diminished following freezing and storage. After a 3 min cooking, the texture of all thawed samples were comparable to that of fresh cauliflower cooked for 10-12 min. AS

99 Ramaswamy (HS) and Ranganna (S). Residual Peroxidase activity as influenced by blanching sulphur dioxide treatment and freezing of cauliflowers. Journal of the Science of Food and Agriculture 47(3); 1989; 376-381

The influence of blanching time and sulphur dioxide treatment on the residual peroxidase activity and its implication for the sensory quality of frozen cauliflowers were assessed after storage for up to one yr. at -18 C. The treated cauliflowers, sealed in polythene bags, were placed in waxed paperboard cartons and frozen in a contact plate freezer at -35 C. The sensory quality of frozen stored cauliflowers related well to their residual peroxidase activity, which was sensitive to the sulphur dioxide treatment. Blanched cauliflowers following a brief dip in a metabisulphite solution prior to freezing gave a significantly ($P<0.05$) superior product even when stored for one yr. The residual peroxidase activity, which ranged from 1 to 5.5% in the blanched samples, was below 1% in the sulphur dioxide treated samples, and the sulphur dioxide content of 50 p.p.m. found in these stored samples disappeared after 3 min cooking in boiling water. AS

Cucurbits

100 Samant (SK) and Rege (DV). Some enzymes and enzyme inhibitors from cucurbit seeds. Journal of the Science of Food and Agriculture 47(3);

1989; 383-385

Urase, lipase and lipoxygenase of cucurbit seeds exhibit significant trypsin- and amylase -inhibitor activities which are thermolabile. BV

Tomatoes

101 Adegoroye (AS), Jolliffe (PA) and Tung (MA). Textural characteristics of tomato fruits (Lycopersicon esculentum) affected by sunscald. Journal of the Science of Food and Agriculture 49(1); 1989; 95-102

Six textural characteristics, deformation, epicarp strength, locular resistance, firmness, compliance and toughness, were calculated from force/deformation curves obtained by punch testing tomato fruits (Lycopersicon esculentum Mill cv Vendor) in which sunscald had been induced by radiation stress. Sunscalded portions of unstored fruits had higher compliance and lower firmness values than the uninjured portions. For the stored fruits, the magnitude of the ripening-induced decrease in epicarp strength, locular resistance and firmness associated with storage was significantly reduced by 'incipient' injury and eliminated by 'advanced' injury. Preferential ripening of the uninjured portions increased deformation and toughness beyond expected values. Various sunscald symptoms such as inhibition of fruit softening, the production of tough tissues, the localisation of sunscalded tissues and the differential ripening uninjured parts relative to the sunscalded portions can be detected by determining force-deformation characteristics of the sunscalded tomato fruits. AS

102 Cantarelli (PR), Palma (ER) and Caruso (JGB). Composition and amino acid profiles of tomato seeds from canning wastes. Acta Alimentaria 18(1); 1989; 13-18

Tomato seeds from processing wastes and previously submitted to Hot and Cold Break treatments were demonstrated to be a potential source of non-conventional protein due to high lysine contents even though showing primary limitation for valine. The effect of such thermal treatments on the protein quality, chemical comp. and amino acid profiles was observed. Valine limitation; protein; fat; carbohydrates; fiber and ash contents were: 67 and 74; 33.71 and 36.77; 14.62 and 19.00; 4.76 and 5.35; 41.78 and 33.04; 2.01 and 2.14% for seeds from Hot and Cold Break treatments, resp. However due to high fiber content tomato seed meals showed to be more suitable for isolation of protein concn. AS

103 Petro-Turza (M), Szarfoldi-Szalma (I), Fuzesi-Kardos (K) and Hajdu (F). Study on taste substances of tomato. I. Analytical investigations into the sugar, organic acid and mineral contents. Acta Alimentaria 18(1); 1989; 97-106

104 Ptero-Turza (M), Szarfoldi-Szalma (I), Fuzesi-Kardos (K) and Barath (A). Study on taste substances of tomato. II. Analytical investigation into the free amino acid, peptide and protein contents. Acta

Alimentaria 18(1); 1989; 107-117

105 Shewfelt (RL), Brecht (JK), Beverly (RB) and Garner (JC). Modification of conditions at the wholesale warehouse to improve quality of fresh-market tomatoes. Journal of Food Quality 11(5); 1989; 397-409

Previous studies suggested that modification of storage temp. at the wholesale could sufficiently retard ripening to permit harvest of fresh market tomatoes at a later maturity, thus allowing for greater flavour development on the vine. Tomatoes (cvs 'Celebrity' and 'Sunny') were harvested either at the breaker or pink stages of maturity. Simulated wholesale storage was conducted by holding breaker fruit for 3 days at 12 C and pink fruit for 3 days at 5 C or 37 C. Short-term low- and high-temp. storage of pink tomatoes delayed ripening sufficiently to maintain acceptable colour and firmness during retail and consumer storage at 21 C for 7 days. Flavour characteristics of tomatoes harvested at the pink stage of maturity were not significantly superior to those of fruit harvested at the breaker stage. Thus, although ripening can be delayed in pink tomatoes during postharvest handling, delaying harvest from the breaker to the pink stage does not offer the flavour advantage to warrant a change in the handling system. AS

Tomato pulp

106 Hanewinkel-Meshkini (S) and Hackmann (W). A contriubtion to the evaluation of tomato pulp. Deutsche Lebensmittel-Rundschau 85(11); 1989; 351-353 (De).

Results indicate that 90% of the tomato pulp samples that were unobjectionable from an optical and sensorial point of view, has an alcohol content of less than 0.1 g/kg, a content of organic acids (total of L-/D-lactic acids and acetic acid) of under 3 g/kg, and a citric acid/total acid relation of over 0.9. BV

FRUITS

107 Binder (RG) and Flath (RA). Volatile components of pineapple guava. Journal of Agricultural and Food Chemistry 37(3); 1989; 734-736

The volatile compounds of pineapple guava (Feihoa sellowiana Berg) fruit were identified by GC-MS and results presented in this paper. The major compounds were found to be germacrene D, bicyclogermacrene, methyl benzoate, beta-caryophyllene (2)-3-hexenyl benzoate, liantool, humlene, and 3-octanone. Out of the 85 compounds identified 47 were not previously reported in pineapple guava. NGKR

108 Engelbrecht (J) and List (D). Physical impacts on the emission of gas during the production of fruit and vegetable juices. Flussiges Obst 56(3); 1989; 104-108 (De).

The data of this study can be used as basis for a process optimization in fruit juice production. The results have shown that especially the preparation of the juices plays a decisive role for the total gas content of the finished product. Especially in the case of fruit flesh containing juices, a strong foam formation in the degasifier can be prevented even before the degasification by specific measurements as for example the use of degasified fruit flesh or degasified water. The residual gas content can be kept low so that no problems appear during and after the filling phase. AS

109 Farnandez Escartin (E), Castillo Ayala (A) and Saldana Lozano (J). Survival and growth of Salmonella and Shigella on sliced fresh fruit. Journal of Food Protection 52(7); 1989; 471-472, 483

The ability of five strains of enteropathogenic bacteria Shigella sonnei. S. flexneri, S. dysenteriae, Salmonella derby, and S. typhi) to survive and grow on sliced jicama, papaya, and watermelon was investigated. Fruit portions were obtained aseptically and inoculated on the surface with washed suspensions of each microorganism. The test organisms survived, and in most cases increased in numbers when inoculated fruits were stored at room temp. (25-27 C) for up to 6 h. Suspensions of papaya and watermelon in sterile distilled water supported growth of S. sonnei and S. typhi, resp. Application of lemon juice to the surface of jicama and papaya reduced the count of S. typhi somewhat, but growth resumed after several hrs. Practical recommendations are presented to control risks of contamination and subsequent growth of enteric pathogens on fruits and fruit salads during preparation and sale. AS

110 King (K), Norton (G), Mitchell (JR) and Caygill (J). In-situ pectin de-esterification of alkali-treated fruit waste materials. Journal of the Science of Food and Agriculture 49(1); 1989; 75-86

Waste peel and pulp materials from orange, lime and mango fruits were treated with sodium carbonate which increased the pH and resulted in the de-esterification of pectin in-situ. Chemical and enzymic (pectinesterase) de-esterification . occurred in each of the treated fruit waste materials. A specific carbonate enhancement of pectinesterase activity which was clearly demonstrated in orange peel was found to a lesser extent in lime pulp but not at all in mango peel. During treatment of the dispersions with sodium carbonate, each of the three fruit waste materials gelled. The pectin degree of esterification of the orange and lime dispersions was below 50% (low methoxyl pectin) on gelling but the mango peel dispersions gelled at pectin degree of esterification levels above 50% although the gelation mechanism was that of a low DE pectin. The degree of esterification of the soluble pectin in the mango dispersion was , however, found to be very much lower than the overall pectin degree of esterification determined. It is suggested that in-suit pectinesterase activity is restricted to the soluble pectin mango peel whereas in the citrus residues both soluble and bound pectin are de-esterified. AS

111 Tuszynski (T). Changes in the degree of pectin demethylation during fermentation of fruit musts. Nahrung 33(2); 1989; 183-189

Musts from apples, plums, black and red currants, pears, cherries and strawberries were subjected to fermentation. In the 84th h of fermentation a definite amount of exogenous pectin was added to some samples. Based on the determined content of methanol (MeOH) and its total presence, measured after alkaline hydrolysis, the degree of pectin demethylation (DDM) was calculated. Great variations of DDM as well as initial and total content of MeOH in particular musts were found. The highest DDM was found in a cherry must (83.4%) and red currant (72.4%). The remaining musts were demethylated in the range from 20 to 65%, except depectinized samples (72-98%). All the musts of 1986 displayed higher contents of total MeOH and lower degree of final demethylations than those of 1984. It has been shown that endogenous pectin contained in musts is not fully demethylated, in spite of the fact that the solution is capable of further demethylation of exogenous pectin. AS

112 Wang (CY). Chilling injury of fruits and vegetables. Food Reviews International 5(2); 1989; 209-236

This review describes the changes in membrane lipids, permeability, proteins, carbohydrates, energy supply, respiration, ethylene production and other metabolic processes that are affected by chilling temp. Method for alleviation of chilling injury such as temp. preconditioning, intermittent warming, chemical treatments, hormonal regulation, controlled atm. storage, genetic manipulation and other methods are also discussed. 281 references. SRA

Grapefruits

113 Toyo'oka (T), Uchiyama (S) and Saito (Y). Effect of gamma-irradiation on thiol compounds in grapefruit. Journal of Agricultural and Food Chemistry 37(3); 1989; 769-775

Grapes

114 Bitteur (S), Gunata (Z), Brillouet (J-M), Bayonove (C) and Cordonnier (R). GC and HPLC of grape monoterpenyl glycosides. Journal of the Science of Food and Agriculture 47(3); 1989; 341-352

The aim of the present study was to find a method alternative to enzymic hydrolysis for the analysis of grape terpenyl glycosides. GC after trimethylsilane derivatisation, and HPLC on four different stationary trimethylsilane derivatisation, and HPLC on four different stationary phases, ie bare silica, aminopropyl-, diol- and octadecyl-bonded silicas, were in turn considered for the separation of these aroma precursors extracted from grape juice, and specific enzymic hydrolyses with highly purified glycosidases showed which were the major components. These investigations show that reversed-phase liquid chromatography is better suited for both the direct and individual analysis of these glycosides. AS

Kiwifruits

115 Stec (MGH), Hodgson (JA), MacRae (EA) and Triggs (CM). Role of fruit firmness in the sensory evaluation of kiwifruit (Actinidia deliciosa cv Hayward) Journal of the Science of Food and Agriculture 47(4); 1989; 417-433

Sensory assessment was carried out on kiwifruit (Actinidia deliciosa (A Chev) Liang et Ferguson cv Hayward) from a number of maturity and post-harvest treatments given in two seasons. The influence of fruit firmness at eating ripeness was evaluated both qualitatively and quantitatively. There was a significant relationship between fruit firmness and overall fruit acceptability across all treatments, such that soft fruit were more acceptable. There was also a trend for the texture of soft fruit to be the most acceptable within each treatment. Soluble solids concn. at eating ripeness and fruit acceptability within any one treatment were not correlated. Core firmness sometimes related to flavour intensity and acceptability. In comparison with firm fruit, soft fruit had more intense and acceptble aromas in one yr., but not in another. However, descriptors in both yrs varied in frequency of usage in relation to fruit firmness in a similar manner. When compared with firm or hard fruit, soft fruit were sweter, less tangy and described as having flavours more characteristics of ripe fruit. No correlation was found between fruit firmness and flavour acceptability. The preferred firmness at eating ripeness varied among assessors. Therefore further sensory evaluations of acceptability in kiwifruit should take this factor into account. Due to the significant effect of fruit firmness on preception of sweetness and acidity in kiwifruit, conclusions as to the relative sweetness of fruit with a different history can only be drawn if fruit of a similar firmness at eating ripeness are compared. These results indicate that the use of sensory assessment to evaluate treatment effects on kiwifruit should be approached with care and with strict control on fruit firmness at assessment. AS

Mangoes

116 Chadha (KL). Mango research in India - new developments. Indian Food Packer 43(6); 1989; 33-47

This review article besides covering the improvements and developments in cultivation and breeding of mango var. also briefly covers th development in storage and ripening of mango. 61 references. KAR

117 Sahni (CK) and Khurdiya (DS). Effect of ripening and storage temperature on the quality of mangoes nectar. Indian Food Packer 43(6); 1989; 5-11

The effect of ripening stage on the quality of mango nectar from mango var. 'Dashehari', 'Chouse', 'Neelum', 'Amarpali', fruits was studied. Mangoes were ripened at room temp. (35.9-36.9 C) and at cool chamber (23.8-27.6 C) and viscosity, acidity, ascorbic acid and total carotenoids were estimated. Dashehari and Chousa var. after a storage for 6-9 days; Neelum and Amrapali var. after a storage for 9 days at room temp. and 12 days at cool chamber could be utilized for nectar prepared from fruits stored for longer period was noticed. Carotenoids and ascorbic acid recorded max. stability in storage under cool storage. Viscosity, pH, acidity, total soluble solids, were not influenced by storage temp. but ascorbic acid loss was more rapidl at ambient temp. Reducing sugars changed rapidly at ambient temp. Sensory quality score was least affected by storage temp. and remained above the acceptability limit. KAR

118 Sangchote (S). Relationship between the physiological state of mangoes and the incidence of anthracnose (Colletotrichum gloeosporioides Penz.). ASEAN Food Journal 4(3); 1989; 123-124

Sweet cherry

119 Drake (SR), williams (MW) and Fountain (JB). Stemless sweet cherry (Prunus avium L.). Fruit quality and consumer purchase. Journal of Food Quality 11(5); 1989; 411-416

Sweet cherry (Prunus avium L.) quality and consumer acceptance at purchase were found to be similar between stem and stemless fruit. Stemless fruit had more of the desired mahogany colour at harvest, but stem fruit displayed superior colour at point of retail sale. At simulated retail sales the colour difference between stem and stemless fruit was not evident. There was no significant difference in firmness or soluble solids content between stem or stemless fruit. Stemless fruit were more bruised than stem, but stem fruit showed more surface pitting. Practical advantages of stemless fruit included: increased efficiency at harvest, elimination of some packinghouse equipment, improved use of packing material and easier consumer packaging, and reduced damage to fruit. AS

Tangerine oranges

120 Ketsa (S). Food quality of tangerine (Citrus reticulata Blanco cv. khieo waan) with thin and thick peel. ASEAN Food Journal 4(3); 1989; 121-122

CONFECTIONERY, STARCH AND SUGAR

Confectionery

121 Schmid (H) and Chiappa (O). Cocoa roasting from the nibs to the liquor. Confectionery Production 54(12); 1988; 713-716

Some considerations are made on the techniques of roasting and treating cocoa according to the philosophies and technological principles proposed by Carle and Montanari and Lehmann. Proper crushing and good shell separation depend on: correct crushing energy for the various cocoa bean provenances or resp. for: raw, dry and roasted beans, possibility of recycling uncrushed beans to obtain separation of shells from the nibs, optional possibilities of regulating the sanction air to separate shells, possibility of using the zig-zag separarators to improve separation of the shells from the nibs before unloading from the winnower. SYR

Chocolates

122 McEwan (JA), Colwill (JS) and Thomson (DMH). The application of two free-choice profile methods to investigate the sensory characteristics of chocolate. Journal of Sensory Studies 3(4); 1989; 271-286

This paper reports an investigation of the usual free choice profiling approach compared with the more structured repertory grid method to elicit the sensory characteristics of five chocolate samples. The method of free choice profiling is based on sensory evaluation carried out by untrained assessors. This method was compared with a more structured approach based on Kelly's reportory grid method and the generalised procrustes analysis was used to analyse configurations obtained from both methods were very similar. NGKR

Cocoa

123 Nuyken-Hamelmann (C), Biehl (B) and Meyer (B). Changes in the amount of eight acids in cocoa seeds during fermentation. Chemie Mikrobiologie Technologie der Lebensmittel 12(2); 1989; 52-57 (De).

Capillary isotachophoresis allowed to determine simultaneously eight acids (citric, oxalic, malic, tartaric, phosphoric, lactic, acetic, and glycollic acid) in various samples of fermented and unfermented cocoa seeds. Additionally changes in the amount of these acids were determined in the course of several fermentations in Malaysia. In unfermented seeds, the content of the first five mentioned acids in the seeds increases progressively with pod ripeness. Variations in the content of the acids in fermented seeds are in the same range as in unfermented seeds. They are not due to differences of provenances. During fermentation, the content of the di- and tricarboxylic acids mentioned above decreases, while phosphoric acid initially increases, due to the liberation from bound phosphate. Lactic, acetic, and glycollic acid are absorbed by the seed from the fermenting pulp during fermentation. AS

Jelly

124 Lees (R). Production of jelly confections - part one. Confectionery Production 54(12); 1988; 734, 749

The quality controlling parameters in the manufacture of gelatine jellies are briefly described, which include composition, heat treatment, presence of other components, processing conditions and conditions for storage. SYR

Starch

125 Dolan (KD), Steffe (JF) and Morgan (RG). Back extrusion and simulation of viscosity development during starch gelatinization. Journal of Food Processing and Preservation 11(2); 1989; 79-101

A generalized apriori theoretical model relating apparent viscosity of protein dough to several independent variables was used to model gelatinized starch dispersions. Independent variables in the original model were shear rate, temp. moisture content, temp.-time history and strain history. The model is applied here to corn starch dispersions gelatinized using various temp.-time treatments. Apparent viscosity of a 13.7% gelatinized corn-starch solution at constant shear rate and strain history was measured at 20 C using a back extrusion technique. Activation energy of gelatinization was estimated as 210 KJ/mol (50 Kcal/mol) over the range 81-95 C. The activation energy decreased in the range 95-105 C. AS

Sugar

Sugarcane juices

126 Kumar (S), Kumar (D) and Sinha (RM). Change in yield attributes, juice quality and mineral nutrients in cane juice due to smut infection. Indian Sugar 39(4); 1989; 233-237

Smut infected sugarcane va. CoJ 64 and B.O. 110 were analysed for chemical characteristics. Reduction in total soluble salts, and ash of juice were noted in juice extracted from smut infected var. while invertase activity, hydrogen ion concn., reducing sugars and titratable acidity were increased. The contents of P, Zn, Cu, and K were depleted in infected var. whereas Na, Ca, N, Mg, Fe and B accumulated in the juice of infected cane. KAR

BAKERY PRODUCTS

Bread

127 Benedito de Barber (C), Prieto (JA), Collar (C) and Barber (S). Isolation, purification and determination of low molecular weight peptides from bread dough. Acta Alimentaria 18(1); 1989; 53-63

Efficiency and suitability of different solvents, 1 mol^{-1} acetic acid (i), distilled water (ii) and 70% ethanol (iii), for the extraction of low mol. wt. peptide fraction from unfermented wheat flour dough are tested. Purification of dough soluble fraction (SN) was carried out following the sequence: ultrafiltration (i, ii) or absolute ethanol precipitation (iii), ion exchange chromatography on Dowex 50W-X2, mol. exclusion chromatography on Sephadex G-10 and ligand exchange chromatography on Cu^{2} + Sephadex, for each solvent tested. Low mol. wt. peptide content was estimated in each purified extract by analysing primary amino nitrogen (AN). Results obtained show that the methodology used is suitable for the isolation and purification of low mol. wt. peptides being their estimated content, larger in the acetic acid extract, 32.6 mg per 100 g dough, d. b. (i), than in the other extracts: 24.0, mg per 100 g dough, d. b. (ii) and 26.9 mg per 100 g dough, d. b. (iii). AS

128 Lathia (DN) and Martina Koch. Comparative study of phytic acid content, in vitro protein digestibility and amino acid composition of different types of flat breads. Journal of the Science of Food and Agriculture 47(3); 1989; 353-364

Phytic acid content of eight different types of leavened and unleavened flat breads was determined. It was highest in unleavened and non-fermented whole wheat chapathi and lowest in the leavened and fermented white wheat flat bread roghni nean. The effect of baking conditions, bread comp. and phytic acid content on in vitro digestibility of protein was measured using a pepsin multienzyme pH stat technique. The amino acids released were separated byultrafiltration. The rate of protein digestibility of flat bread and amino acid released depended upon the type of flour used, baking conditions, phytic acid content and other antiproteolytic constituents of breads. Leavening and fermentation of breads resulted in an increase of protein digestibility and availability of amino acids. Addition of soy flour increases the protein digestibility of breads whereas millet flour decreases it. AS

129 Mahmound (RM) and Abou-Arab (AA). Comparison of methods to determine the extent of staling in Egyptian type breads. Food Chemistry 33(4); 1989; 281-289

This investigation was carried out to compare the different methods used for the detn. of extent of staling in Egyptian type breads. This has been done by following staling rates of the most popular wheat bread types (Balady shamy and Fino) during 48 h. Of storage periods at room temp. by loss of moisture, total water solubles, swelling power, starch intrinsic viscosity and sensory evaluation and freshness detn. It was found that the rate of staling was higher in Balady bread than that of Fino and shamy breads. When comparisons were made between different methods for staling rate of bread a correlation coeff. of 0.916 was found between organoleptic values and swelling power. As swelling power has been found to be the most simple and rapid test it has been recommended in Egypt for following staling of bread of various types. NGKR

130 Silaula (SM), Lorimer (NL), Abik (ME) and Uebersax (MA). Rheological and sensory characteristics of bread flour and whole wheat flour doughs and breads containing dry roasted air-classified pinto and navy bean high protein fraction. Cereal Chemistry 66(6); 1989; 486-490

Dry-roasted navy and pinto bean cotyledons were ground and air classified. The high-protein (40-44%) fractions were used as a substitute for bread flour and whole wheat flour in dough and bread systems. Blends of bread or whole wheat flour/high-protein legume flour were prepared in the proportions 100:0, 90:10, 85:15, and 80:20. Water absorption, arrival, and dough development time increased while stability decreased for both bread flour and whole wheat flour farinograms. Treatments, with 10 or 20 p.p.m. potassium bromate and 0.5 or 1% sodium stearoyl-2-lactylate improved bread vol. Legume substitution tended to increase tenderness and reduce lightness of breads. Increasing levels of legume substitution significantly decreased many sensory parameters of white bread, but fewer significant differences were found for whole wheat breads. AS

Cookies

131 Pomeranz (Y), Lookhart (GL), Rubensthaler (GL) and Albers (L). Changes in gliadin proteins during cookiemaking. Cereal Chemistry 66(6); 1989; 532-534

Gliadin proteins were characterized in sugar snap cookies from eight flours representing both soft and hard wheats varying widely in protein contents and functional properties that were baked by a conventional method or steamed. The methods used for gliadin characterization included polyacrylamide gel electrophoresis and high-pressure liquid chromatography. Chromatographic peaks of highly hydrophobic gliadin proteins extracted from steamed cookies were smaller than those extracted from baked cookies; the decrease was larger in good than in poor cookies flours. The results indicated that binding (in extractability) of gliadin proteins during baking varies with end-use properties of cookie flours, type of baked product, and type and length of baking regime. AS

Pasta

132 Lichodzievskaja (IB), Braudo (EE), Chimirov (JI), Muchin (MA), Tolstoguzov (VB), Muschiolik (G) and Webers (V). Production of pasta from baking flour with addition of polysaccharides. Nahrung 33(2); 1989; 191-201 (De).

A study has been undertaken to investigate the influence of polysaccharide additives and additives of low mol. salts on the quality of pasta from baking flour and weak-wheat semolina. By addition of sodium alginate, beet pectin or methyl cellulose to the dough the stability of the dried and cooked pasta increase and the cooking loss decreases. The yellowiness of the cooked noodles can be improved by addition of potassium bicarbonate. Recipes for the addition of polysaccharides and potassium bicarbonate to the noodle dough are given and their favourable influence on the noodle quality is demonstrated. Owing to these additives the properties of the pasta are less dependent on the extrusion temp. AS

MILK AND DAIRY PRODUCTS

133 Benkerroum (N) and Sandine (WE). Inhibitory action of nisin against Listeria monocytogenes. Journal of Dairy Science 71(12); 1988; 3237-3245

The sensitivity of nine strains of Listeria to nisin was determined as well as the min. inhibitory concn. of nisin necessary to completely inhibit growth of these strains. All strains tested were variably sensitive to nisin and different MIC values were obtained, ranging from 740 to 10^5 IU/ml in trypticase soy agar and from 1.85 to 10^3 IU/ml in MRS agar. The inhibition of L. monocytogenes ATCC 7644 in TSB trypticase at different pH values and in sterilized and non-sterilized cottage cheese by nisin (37 x 10^2 IU/ml and 2.55 x 10^3 IU/g, resp.) also was investigated. This bacterium was completely inhibited after 24 h at pH 5.0 and above. At pH 4.5, 4.0, and 3.5, it was inhibited within 24 h. In cottage cheese no Listeria survivors were found at 24 h at 37 and 4 C whether or not the cheese had been sterilized when as many as 0.35 x 10^6 cell/g were added to zero time. AS

134 Fernandes (CF), Shahani (KM) and Amer (MA). Effect of nutrient media and bile salts on growth and antimicrobial activity of Lactobacillus acidophilus. Journal of Dairy Science 71(12); 1988; 3222-3229

The Lactobacillus acidophilus strains produced variable quantities of antimicrobial substances in three different media: Elliker's MRS (deMan, Rogosa, and Sharpe), and LBS (Lactobacillus selection) broths. The interaction between L. acidophilus strain and nutrient medium was statistically significant, indicating an influence of the nutrient medium on the level of antimicrobial activity produced. Also statistically significant different were levels of the antimicrobial activity of different strains and the pH of the medium at the end of the fermentation period. Bile salts were added to MRS broth to simulate concn. in gastrointestinal tract of humans. Antimicrobial activity as well as growth decreased in the presence of high concn. of bile salts. Sodium glycocholate was more inhibitory than sodium taurocholate at equimolar levels. Calcium hydroxide was added to MRS broth at hourly intervals for 8 h to adjust the pH of the fermentation medium to pH of 6.5, which resulted in a doubling of cell numbers. However, there were no differences in the levels of antimicrobial activity at the end of 24 h. Although there were no differences in pH of the fermentation medium at the end of 24 and 48 h, the antimicrobial activity increased after 24 h of fermentation. AS

135 Girdhari Lal) and Verma (RD). Dairy waste treatment methods. Indian Dairyman 41(9); 1989; 469-474

Dairy wastes are rich in degradable organic matter and exert a high oxygen demand. Selection of proper treatment method therefore depends upon whether the disposal is done into water course or into public sewers or on to land for irrigation. Treatment methods described include activated sludge process, aerated lagoons, oxidation ditch, trickling filter and rotating biological discs. These have been compared with respect to biological oxygen demand, cost, land requirement and economic factors. KAR

136 Kang (Y-J) and Frank (JF). Biological aerosols. A review of airborne contamination and its measurement in dairy processing plants. Journal of Food Protection 52(7); 1989; 512-524

Processing plant air is a source of post-pasteurization contamination of dairy products. Little is known about the extent to which biological aerosols contaminate pasteurized products, however evidence indicates that air within a packaging area is a critical control point for both pathogens and spoilage microorganisms. Consequently, it is important to understand the characteristics of biological aerosols, learn how to control their occurrence, and discover practical and valid monitoring methods. Methods used for monitoring viable particles in air include the use of sedimentation plates, impingers, slit and sieve impactors, filters, and centrifugal samples. Each of these methods has limitations on its usefulness for dairy plant air monitoring. Microorganisms are often injured due to the stresses of the aerosolized state and consequently may not grow on selective media. Sampling methods such as impingement and filtration which subject the organisms to additional stress may cause sufficient injury to prevent growth on non-selective media. However, Gentler collection methods such as centrifugal samplers may not generate enough force to collect the smallest viable particles. Aerosols are generated within the dairy plant by worker activity, sink and floor drains, water spraying, and air conditioning systems. Environmental sanitation, air filtration, air flow control, and control over personnel cleanliness and activity are useful control measures. The adoption of "clean room" design principles for a packaging area will aid in controlling biological aerosols in new dairy processing plants. AS

137 Katre (BC) and Prasad (S). Minimising consumption of electrical energy in dairy processing. Indian Dairyman 41(9); 1989; 475-478

Increase in processing cost adds to the price of the final product and the electricity attributes to a sizeable operational cost of the dairy processing plant. The various points to be considered in minimising electricity consumption in a dairy factory include improving power factor by selecting the ideal equipment, mnimising running of equipment at partial load, proper scheduling of process operations and preventive maintenance. Main losses have been attributed to utility shortage, heat loss, pressure of head loss and milk reprocessing. Measures to overcome this have been indicated. KAR

Milk

138 Bauer (S), Schindler (D) and Kroll (J). Test method for the determination of aflatoxin M_1 in milk and milk products, studied for standardization. Nahrung 33(2); 1989; 217-219 (De).

139 Chandler (RE) and McMeekin (TA). Temperature function integration as the basis of an accelerated method to predict the shelf life of pasteurized, homogenized milk. Food Microbiology 6(2); 1989; 105-111

The number of psychrotrophic pseudomonads in pasteurized, homogenized milk after a specified storage time was correlated with an equivalent storage time at 4 C using a time/temp. function integrator (TTFI). This incorporated a relative rate function based on the square root model and a notional min. temp. value (T_{MIN}) of 263 K. A simple accelerated shelflife test using the TTFI and storage at 12 C is proposed. Practical applications for TTFI in process control and shelflife prediction are suggested. AS

140 D'Aoust (J-Y), Park (CE), Szabo (RA), Todd (ECD), Emmons (DB) and McKellar (RC). Thermal inactivation of Campylobacter species, Yersinia enterocolitica and hemorrhagic Escherichia coli 0157:H7 in fluid milk. Journal of Dairy Science 71(12); 1988; 3230-3236

Heat treatment of raw milk in an HTST pasteurizer operated at 60.0 to 72.0 C for a min. holding time of 16.2 s rapidly inactivated mixtures of hemorrhagic Escherichia coli 0157:H7, Yersinia enterocolitica and Campylobacter spp. (C. fetus, C. coli, and C. jejuni). Each of the three genera in the mixture was inoculated at a level of approx. 1.0 x 10^5 cfu/ml. At 60.0 C, hemorrhagic E. coli showed a max. 2 $\log_{10}$ reduction in counts and no viability at greater than or equal to 64.5$_{10}$ C. Yersinia enterocolitica and Campylobacter spp. showed greater heat sensitivity with a 4 $\log_{10}$ reduction in counts at 60.0 C and absence of viable cells at greater than or equal to 63.0 C. These findings reiterate the need for stringent control of thermal processes in the manufacture of dairy products from raw or heat-treated (non-pasteurized) milk. AS

141 Greenwood (M) and Hooper (WL). Impoved methods for the isolation of Yersinia species from milk and foods. Food Microbiology 6(2); 1989; 99-104

Recovery of Yersinia spp. following enrichment of milk samples in tris-buffered peptone water pH 8.0 (TPW) incubated at 9 C was compared with recovery from buffered peptone water pH 7.2 (BPW) incubated at 4 C. The number of isolations obtained from TPW/9 C was approx. twice the number obtained from BPW/4 C. Weekly subculture to Cefsulodin Irgasan-Novobiocin (CIN) agar for three wks was found to achieve greatest recovery of Yersinia, but this might be replaced by a single subculture after 11-14 days, enrichement with little loss of recovery. When enrichment of milk and food samples in TPW incubated at 9 C was followed by post enrichement alkali treatment, the detection of Yersinia sp. was again improved, particularly from food samples. A regime of enrichment at 9 C in TPW followed by post-enrichement alkali treatment immediately before subculture to CIN agar is recommended for the recovery of Yersinia spp. from milk and foods. AS

142 Harwalker (VR), Boutin-Muma (B), Cholette (H), McKellar (RC), Emmons (DB) and Klassen (G). Isolation and partial purification of astrin-

gent compounds from ultra-high temperature sterilised milk. Journal of Dairy Research 56(3); 1989; 367-373

Astringent off-flavours were observed in commercial samples of UHT-milk heated by direct-steam injection. The off-flavour components from these milk samples were isolated by the chloroform-methanol extraction procedure of Harwalkar & Elliott. The astringent-tasting components in these extracts were partly purified by isoelectric precipitation at pH 7.0 and by size exclusion chromatography on Sephadex G-50 columns. The extracted off-flavour components and the partly purified samples were further analysed by FPLC using a Mono-Q anion exchange column and PAGE. The FPLC and PAGE patterns of the extracts from astringent and non-astringent samples of milk showed marked differences and the astringent flavour correlated with one of the fractions resolved by FPLC. This fraction was found to be heterogeneous by PAGE. The astringent off-flavour in UHT-sterilized milk were Gamma-casein-like breakdown products of casein. AS

143 Marshall (RT), Wijeratne (SA) and Jesse (SD). Abnormal freezing of milk caused by ice-nucleating bacteria. Journal of Food Protection 52(7); 1989; 496-497, 502

Cultures of ice nucleating bacteria isolated from raw producer bulk milk were gram negative rods, mostly Pseudomonas fluorescens. Milk samples from which the cultures were isolated prefroze during supercooling in the cryoscopic test of freezing point. Grown under conditions of restricted nutrition, cells transferred to normally freezing samples imparted the ice nucleating factor. AS

144 Misra (AK) and Kulla (RK). Bacteriological quality of market milk. Indian Dairyman 41(9); 1989; 487-491

Various groups of bacteria present and the quality of milk produced and distributed in Calcutta (Indi and its suburbs have been assessed by collecting and analysing 125 samples of raw milk and 25 samples of pasteurized milk from organised dairy farms, vendors, sweetmeat shops and dairy plants. The bacterial number were in the range of 20 x 10^3 to 19 x 10^6 /ml. Plate counts were highest in milk from sweetmeat shops (9 x 10^5 to 19 x 10^6 /ml) and the city vendors (62.5 x 10^4 to 17 x 10^6 /ml). The average coliform counts were 6.74 x 10^3 /ml and 6.5 x 10^3 /ml for milk from sweetmeat shops and vendors resp. Total plate counts in milk from organised dairy farms were 96 x 10^3 to 25 x 10^5 /ml and 27 x 10^1 to 90 x 10^2 /ml of coliforms. The total counts in pasteurised milk from dairy plants ranged between 20 x 10^3 and 103 x 10^3 /ml and only 40% of the samples were within the prescribed standards. The psychrophillic, thermoduric and thermophillic counts ranged from 20 x 10^2 to 30 x 10^5 /ml, 45 x 10 to 60 x 10^3 /ml and 3 x 10^1 to 91 x 10^2 /ml, resp. Of the total 150 samples collected 11.3% could be categorised as good milk, 37.3% fair milk, 36.7% poor milk and 14.7% very poor milk. KAR

145 Pierre (A). Milk stability in ethanolic solutions. Journal of Dairy Research 56(3); 1989; 521-527

Milk stability in ethanolic solutions depends on many factors. Mechanism of destabilization remains incompletely characterized particularly the role of milk pH is not wholly understood. The role of pH in the destabilization of milk and sodium caseinate solution by ethanol was investigated. Ethanol shifted the pH of min. stability of both caseinate and milk to higher values. A linear relation between this pH and the reciprocal dielectric constant of the mixture was observed. The addition of Ca to these alcoholic mixtures also increased the pH of min. stability. Milk is aqueous solution behaved as a caseinate, when pH was decreased, ionization of serine phosphate was reduced and that all of the micellar Ca was released from the protein before isoelectric precipitation. In ethanolic solutions, when pH decreased, ionization of serine phosphate was also reduced but Ca was not released from casein and the isoelectric point was reached at a higher pH. Ca could not be released because the solubility product of Ca (phosphate was very low in ethanolic solutions and consequently did not allow solubilization. These variations in casein charge will induce changes in protein hydration affecting protein conformation and micellar size. MCV

146 Pouliot (Y), Boulet (M) and Paquin (P). Experiments on the heat-induced salt balance changes in cow's milk. Journal of Dairy Research 56(3); 1989; 513-519

The heat-induced changes in salt balance between the colloidal phase of milk and its serum were studied using an ultrafiltration technique. Milk permeate was isolated at the heating temp. by means of a hollow fibre ultrafiltration cartridge coupled with a stainless steel heat exchanger unit. The milk samples initially at 4 C were heated to 20, 40, 60, 80 or 90 C. Ca, P, Mg and citrate contents of the permeates were determined. The decreases in Ca and P were proportional to the increase in temp. Smaller losses in Mg and citrate were observed. An initial sharp decrease in concn. occurred within the first seconds of holding time and was followed by a slower and smaller decrease. The possible occurrence of a two-stage mechanism for the heat-induced salt precipitation is discussed. The precipitation of dicalcium phosphate is believed to occur together with some tricalcium citrate precipitation. AS

Milk powder

147 Tuohy (JJ) and Kelly (PM). Effect of direct gas-fired heating on the oxidative stability of whole milk powder. Israel Journal of Technology 13(1); 1989; 33-41

Direct heating of the drying air, by direct firing with liquid petroleum gas (LPG) and natural gas, was compared with indirect heating for the manufacture of whole milk powder on a pilot-scale spray drier. Direct firing with LPG and natural gas resulted in TBA values of 0.037-0.054 (abs. units 530 nm) after manufacture compared with values of 0.016-0.018 for control (indirectly heated) powders when a conventional gas burner was used. With an excess in air type burner no significant difference in TBA value was found after manufacture or after 31 and 58 wks storage at 37 C. AS

Milk products

Cheese

148 Anprung (P), Chuengsaengsatityaporn (S) and Thunpithayakul (C). Immobilized rennin for cheese making I. Preparation and enzymic properties of rennin immobilized and sand. ASEAN Food Journal 4(3); 1989; 107-110

This study reports parameters relative to the immobilization, pH and temp. profiles, kinetic properties, half life, leaching of immobilised rennin, electron, micrograph of renin fixed to sand and storage stability of immobilised rennin. SRA

Blue cheese

149 Papageorgiou (DK) and Marth (EH). Fate of Listeria monocytogenes during the manufacture and ripening of blue cheese. Journal of Food Protection 52(7); 1989; 459-465

Mozzarella cheese

150 Hashisaka (AE), Weagant (SD) and Dong (FM). Survival of Listeria monocytogenes in Mozzarella cheese and ice cream exposed to gamma irradiation. Journal of Food Protection 52(7); 1989; 470-492

The survival of Listeria monocytogenes preinoculated into ice cream and Mozzarella cheese prior to gamma-irradiation treatment was determined. Samples were maintained at -78 C and exposed to targeted doses of 2, 4, 8, 16 and 32 kGy of gamma-irradiation. The calculated D_{10} values were 1.4 kGy for Mozzarella cheese and 2.0 kGy for ice cream. The effective level of irradiation (12D) for inactivating L. monocytogenes was 16.8 kGy for Mozzarella cheese and 24.4 kGy for ice cream. AS

Kishk

151 Jandal (JM). Kishk as fermented dairy product. Indian Dairyman 41(9); 1989; 479-481

Kishk is a milk based fermented food of Egypt, Lebanon, Syria and Iraq, prepared from the butter milk and wheat mixture. Author describes its manufacturing method and its chemical constituents including total solids (92.05-92.60), total N (2.1%), protein (13.43-23.05%) digestion (90%), biological value (66%), salt (4.81%), vitamins, acidity, amino acid content and bacteriological characteristics. KAR

Whey

152 Roehl (D) and Jelen (P). Surface tension of whey and whey derivatives. Journal of Dairy Science 71(12); 1988; 3167-3172

The surface tension of various whole wheys, solutions of component whey proteins, UF fractions, and the effect of heating on the surface tensions of these solutions were determined using the Wilhemy plate method. The mean surface tension of three commercial cottage cheese wheys, a commercial cheddar cheese whey, and a lab. rennet whey was found to be 41.7 plus or minus 1.2 dyne/cm (25 C) and did not vary significantly with the type of whey despite differences in both pH and protein content. The surface tensions of aqueous solutions of individual pure protein fractions of whey (serum albumin, beta-lactoglobulin, alpha-lactalbumin, and gamma-globulins), in concn. approx. normal whey contents, were significantly different and greater than for the whole wheys. Heating of individual protein solutions at 80 C for 50 min produced insignificant changes in measured surface tension despite producing protein precipitation in some of the solutions. Similar heating of the whole whey solutions resulted in a significant decrease in surface tension and marked precipitation in most cases. The fractionation of the wheys into UF permeates and retentates resulted in a retentate fraction of significantly lower surface tension than for UF permeates. Heating increased the surface tension of retentate fractions while the permeate fractions showed a decrease. AS

Yoghurts

153 Foley (J) and Mulcahy (AJ). Hydrocolloid stabilisation and heat treatment for prolonging shelf life of drinking yoghurt and cultured buttermilk. Israel Journal of Technology 13(1); 1989; 43-50

Genu pectin was more effective than proplylene glycol alginate and carboxymethyl cellulose in preventing heat-induced serum separation in yoghurt and in cultured buttermilk. Serum separation decreased with increase in stabiliser concn. up to about 20% expressed as a percentage of the milk protein. Increases in storage temp. and time led to increased serum separation. The presence of 2.3% fat reduced separation. A shelf life of over 20 wks was achievable with heat-treated pectin-stabilised yoghurt and buttermilk. The viscosity values of these products increased with increase in the level of stabiliser and decreased during storage. AS

154 Lee (H), Friend (BA) and Shahani (KM). Factors affecting the protein quality of yoghurt and acidophilus milk. Journal of Dairy Science 71(12); 1988; 3203-3213

The apparent protein digestibility in vivo, the protein digestibility in vitro, the net protein ratio, and computed protein efficiency ratio were used to assess the protein quality of yoghurt and acidophilus milk as affected by heat treatment, direct acidification, addition of culture, or fermentation. Rats fed diets containing either heated mix or yoghurt tended to eat more and gain more wt. than rats fed diets containing either unheated mix or the acidified yoghurt. Feed efficiency was also significantly higher for rats fed heated mix and yoghurt. The apparent protein digestibility in vivo was significantly higher in yoghurt diet than in the unheated yoghurt diet was significantly higher than that of either the unheated mix or the acidified yoghurt but not significantly different from the heated mix. The computed protein efficiency ratio values were also increased with both heating and fermentation The direct acidified yoghurt had a significantly lower net protein ratio and lower computed protein ratio and lower computed protein efficiency ratio than the fermented yoghurt. Rats fed either sweet acidophilus (unfermented) or acidophilus milk exhibited a significantly higher protein digestibility than rats fed heated milk. AS

155 Tomar (SK) and Prasad (DN). Therapeutic value of yoghurt - an assessment. Indian Dairyman 41(9); 1989; 483-485

The information available on the health aspects of yoghurt - a fermented milk product prepared and consumed traditionally in Balkan States - have been collected which indicate that there is need for conducting controlled and well documented studies to support the therapeutic properties of yoghurt. The aspects covered in the article include yoghurt and its influence on gastrointestinal disorders, hypocholesterolaemic effect, antitumor effect and other therapeutic uses. KAR

Milk proteins

Casein

156 Dickinson (E). Surface and emulsifying properties of caseins. Journal of Dairy Research 56(3); 1989; 471-477

This paper describes some recent esearch directed towards understanding the surface chemistry of casein films adsorbed at the oil-water interface. The properties of adsorbed films of alpha$_{s1}$ -, beta- and K-casein and sodium caseinate are compared at the planar oil-water interface, at the surface of emulsion droplets and at the surface of polystyrene latex particles. The paper discusses in detail the (i) relationship between the mole. characteristics of the caseins and their surface activities and surface viscosities at the oil-water interface, (ii) the nature of competitive adsorption between the caseins (particularly alpha-$_{s1}$ and beta-) and (iii) the effect of Na and Ca ion concn. on electrophoretic mobilities and floculation behaviour. MCV

157 Lorient (D), Closs (B) and Courthaudon (JL). Surface properties of the bovine casein components. Relationships between structure and foaming properties. Journal of Dairy Research 56(3); 1989; 495-502

In order to optimize the use of casein as surfactants, the surface tension, foaming capacity and stability were measured as a function of pH, ionic strength, protein concn. and polarity (modified by covalent binding of carbohydrates). The caseins differ in their behaviour at the air/water interface with beta-casein showing the greatest ability to decrease surface tension and to produce foams, due probably to its amphipathic structure. In exp. carried out at pH values close to pI, with low ionic strength and constant solubility (optimal conditions for foam formation), A high surface hydrophobicity, a good accessibility and flexibility of peptidie side chains (evalauted by proteolysis), and a high foaming capacity paralled by increased surface pressure has been observed. Foam stability of caseins was low compared to those of globular proteins such as beta-lactoglobulin. AS

158 Meisel (H) and Frister (H). Chemical characterisation of bioactive peptides from in vitro digests of casein. Journal of Dairy Research 56(3); 1989; 343-349

Bioactive peptides have been identified as digestion products of several food proteins. Milk protein is a rich source of biologically active peptides such as casmorphines (CSM) and caseinophosphopeptides (CSP) having nutritional implications. The in vivo formation of biologically active caseinopeptides during intestinal digestion of bovine casein was studied. It was proved that bioactive peptides were released in the small intestine of minipigs in the course of luminal digestion of diets containing bovine casein. An opioid peptide and a phosphopeptide were isolated from jejunal chyme and were chemically characterised. The opioid peptide was identified as a fragment of beta-casein (60-70). This peptide, named beta-casomorphin-11, displayed substantial opioid activity in an opiate receptor-binding assay. The CSP has been shown to be a fragment of alpha S_1 -casein (66-74). CSPs are likely to enhance the rate of passive Ca absorption from the distal small intestine lumen by increasing the concn. of soluble Ca. CSPs can also from organophosphate salts with trace elements such as Fe, Zn and Cu and have applications as dietary supplements and as medicines. MCV

159 Vegarud (GE) and Langsrud (T). The level of bitterness and solubility of hydrolysates produced by controlled proteolysis of caseins. Journal of Dairy Research 56(3); 1989; 375-379

Protein hydrolysates are produced for distinctly different purposes such as their functional properties and production of small peptides and amino acids used in dietetic foods and flavouring agents. A series of hydrolysates from commercial sodium caseinate and rennet casein were prepared using different commercial proteolytic enzyme preparation. Corolase PS (powder preparation of fungal proteinase form Aspergillus sp.), Corolase L 10 (liquid papain protease from papaya), Maxatase LS 400.000 (proteinase from Bacillus licheniformis and NOVOZYM 257 (proteinase from B. subtilis). Increasing degree of hydrolysis, DH, resulted in markedly changed solubility of the products. The level of bitterness varied with the enzyme used. Non-bitter hydrolysates of sodium caseinate were obtained with a DH 10-12 and protein solubilities of 99%. The rennet casein hydrolysates exhibited low levels of bitterness and high solubility (90%), even at high DH values (DH = 55). Limited hydrolysis to a preselected DH can give products with high solubilities and no(or little) development of bitter taste, depending on the enzymes used. MCV

MEAT AND POULTRY

Meat

160 Moughan (PJ), Schrama (J), Skilton (GA) and Smith (WC). In-vitro determination of nitrogen digestibility and lysine availability in meat and bone meals and comparison with in-vivo ideal digestibility estimates. Journal of the Science of Food and Agriculture 47(3); 1989; 281-292

161 Rogov (IA), Tokacv (ES) and Kovalev (JL). New approaches to raw meat processing as a result of recent studies of food exotrophia. Nahrung 33(2); 1989; 119-131

The general supermacy of classical theory of balanced nutrition entailed the tendency to remove ballast substances from food products. However, a new theory of adequate nutrition grounded significant role of these substances in human ration. On the basis of experimental observations and theoretical theses of a new theory it was determined that animal connective tissue elements can be considered as ballast substances, that are physiologically useful for human organism. Proceeding from this a conclusion was made that a definite content of connective tissue in meat products does not reduce, but raises their nutritional value. A new level of knowledge made it possible to propose the modified method of integral score for food products nutritional value estimation. AS

162 Stanker (LH), Bigbee (C), Emon (JV), Watkins (B), Jensen (RJ), Morris (C) and Vanderlaan (M). An immunoassay for pyrethroids. Detection of permethrin in meat. Journal of Agricultural and Food Chemistry 37(3); 1989; 834-839

The development of several monoclonal antipyrethroid antibodies and an immunoassay for detection of permethrin in meat has been discussed in this paper. Synthetic pyrethroids are important class of insecticides which are widely used in modern agriculture and their analysis was found to be difficult due to their thermal instability and photoinstability. The three monoclonal anti-pyrethroid antibodies differentially recognize a range of synthetic pyrethroids, preferring phenothrin, permethrin cypermethrin and deltamethrin. One of these antibodies referred as py-1 has been used for this immunoassay for permethrin in meats. This assay was sensitive in the range of 50-500 p.p.b. permethrin in ground beef and so is found to be sensitive to detect permethrin when found to be in excess of permitted limit of 150 p.p.b. NGKR

163 Townsend (MA), Gupta (S) and Pitts (WH). Optimal roasting. Journal of Food Processing and Preservation 11(2); 1989; 117-145

In this article the application of numerical optimization techniques to the process of roasting meat under a var. of conditions of temp. was discussed and reviewed. It covers description of model; optimization; variables in the roasting process; optimization procedure and development details; modified objective functions and conclusions. NGKR

164 Townsend (WE) and Blankenship (LC). Methods for detecting processing temperatures of previously cooked meat and poultry products. Journal of Food Protection 52(2); 1989; 128-135

The review presents information relating to current procedures used by Food Safety Inspections Service (FSIS) for maintaining the adequacy of heat treatment of meat and poultry products and current research activities aimed at developing new and/or improved methods for determining max. internal temp. (MIT) of meat and poultry products. CTD

Beef

165 Boggs (DL), White (FD), Reagan (JO) and Smith (TL). Effect of tallow supplementation on beef longissimus fatty acid distribution. Journal of Food Quality 11(5); 1989; 357-364

166 Medeiros (LC), Field (RA), Menkhaus (DJ), Riley (MI) and Russell (WC). Effect of electrical stimulation and blade tenderization on palatability of beef longissimus and semimembranosus muscles. Journal of Food Quality 11(6); 1989; 487-495

The effect of electrical stimulation (ES) and/or blade tenderization (BT) on palatability of longissimus (LD) and semimembranosus (SM) muscles from ranges grazed and conc.-fed steers were compared. Range-grazed steers graded lower and the steaks contained less fat and more moisture ($P<0.05$) than those from conc.-fed steers. Broiled steaks from the range-grazed steers were less flavourful, less juicy, and less desirable overall than those from conc.-fed steers ($P<0.05$). Nevertheless, tenderness of ES and BT treated steaks from range-gazed steers was comparable to steaks from conc.-fed animals that had not been tenderized. Flavour and juiciness of LD muscle did not change with ES or BT treatments were used. AS

167 Penfield (MP), Costello (CA), McNeil (MA) and James Riemann (M). Effects of fat level and cooking methods on physical and sensory characteristics of restructured beef steaks. Journal of Food Quality 11(5); 1989; 349-356

168 Seideman (SC), Cross (HR) and Crouse (JD). Carcass characteristics, sensory properties and mineral content of meat from bulls and steers. Journal of Food Quality 11(6); 1989; 497-507

Thirty-three bulls and 22 steers were slaughtered and subsequent carcasses were evaluated for carcass characteristics. Longissimus muscle samples were analysed for sensory properties and concn. of Cu, Fe and Zn. Bulls produced carcasses with older maturity characteristics, larger ribeyes, less fat and produced longissimus steaks that were less tender and had more organoleptically detectable connective tissue than steaks from steers. Zn concn. was significantly correlated to skeletal maturity, fat thickness, ribeye area, conective tissue and tenderness before adjusting for sex. After adjusting for sex, mineral content did not significantly correlate as well with many carcass or sensory properties as before adjusting for sex. AS

169 Tarrant (PV). Animal behaviour and environment in the dark-cutting condition in beef. A review. Israel Journal of Technology 13(1); 1989; 1-21

Review. 49 references. BV

170 Walls (I) and Sheridan (JJ). A rapid method of enumerating microorganisms from beef, using an acridine orange direct-count technique. Israel Journal of Technology 13(1); 1989; 23-31

Pork

171 Ayob (MK), Ragab (AA), Allen (JC), Farag (RS) and Smith (CH). An improved rapid, ELISE technique for detection of pork in meat products. Journal of the Science of Food and Agriculture 49(1); 1989; 103-116

172 Jeremiah (LE) and Jones (SDM). The effects of spray chilling and vacuum packaged storage on purge losses and the retail properties of pork. Journal of Food Protection 52(7); 1989; 473-476

Products

Bacon

173 Sen (NP), Seaman (SW), Baddoo (PA) and Weber (D). Determination and occurrence of 2-(hydroxymethyl)-N-nitrosothiazolidine in fried bacon and other cured meat products. Journal of Agricultural and Food Chemistry 37(3); 1989; 717-721

A sensitive method for the detn. of 2-(hydroxymethyl)-N-nitrosothiazolidine (HMNThZ), a non-volatile N-nitroso compound, in fried bacon and miscellaneous cured meats has been developed. The method consists of extraction of the sample with acetonitrile/glacial acetic acid (100:1) in the presence of fats and lipids by liquid-liquid partitioning with isooctane, cleanup on basic alumina containing 6% water, and analysis of the cleaned-up extract by high-performance liquid chromatography-thermal energy analyzer (HPLC-TEA). The detection limit of the method is about 1-2 p.p.b. Recoveries of HMNThZ added to fried bacon at 20-50 p.p.b. levels ranged between 80 and 95%. Of various samples analyzed, 12/16 fried bacon (mean, 5.3 p.p.b; range, negative to 13 p.p.b.), 0/7 raw bacon, and

1/9 miscellaneous cured meats (a smoked ham, 2.8 p.p.b.) gave positive results. Confirmation was done by gas-liquid chromatography-thermal energy analyzer (GLC-TEA) analysis after trimethylsilylation, and also by GLC-TEA, HPLC-TEA, and GLC-mass spectrometric analyses after derivation of HMNThZ to its O-methyl ether. AS

Frankfurters

174 Bechtel (PJ), Oreskovich (DC), Mckeith (FK), Martin (SE) and Novakofski (J). Properties of frankfurters processed with potassium and sodium bicarbonate. Journal of Food Quality 11(6); 1989; 475-485

A study was designed to evaluate the use of low levels of sodium (0.25, 0.5, 1%) and potassium(0.25, 0.5%) bicarbonate on the sensory, microbial and functional properties of frankfurters. Both sodium and potassium bicarbonate resulted in higher pH values than control (no bicarbonate) on day 0 but differences diminished after storage at 4 C for 22 days. At the 0.5% level of addition, both sodium and potassium bicarbonate treatments had lower percent free water when compared to controls. The addition of high levels of bicarbonate resulted in diminished sensory properties; however, low levels had sensory characteristics in the acceptable range. No differences were detected between treatments for aerobic plate counts, anaerobic plate counts or yeast and mold counts. Results indicate on acceptable product can be produced using low levels of either sodium or potassium bicarbonate. The use of low levels of bicarbonate also results in benefical changes of some physical properties. AS

Ham

175 Cassiday (PK), Brackett (RE) and Beuchat (LR). Evaluation of ten selective direct plating media for enumeration of Listeria monocytogenes in hams and oysters. Food Microbiology 6(2); 1989; 113-125

The suitability of ten direct plating media for isolating and enumerating four strains of uninjured and injured Listeria monocytogenes from dry and country-cured hams, and raw oysters was evaluated. Five different lots of each food were inoculated with approx. 10^2, 10^4 or 10^5 -10^6 viable L. monocytogenes cells g^{-1}. Populations of the organism were determined by surface plating appropriate dilutions onto the test media. Inoculated media were incubated at 30 C for 48 h before L. monocytogenes colonies were counted and confirmed. LiCl Phenylethanol Moxalactam Agar (LPMA) was selected as the most suitable medium for isolating and enumerating L. monocytogenes from both types of ham, while Dominguez Rodriguez Isolation Agar (DRIA) was selected as most suitable for raw oysters. Selection of the most suitable media was based on relative recovery of viable cells as well as ease of recognizing and counting L. monocytogenes colonies. AS

Poultry

176 Izat (AL), Colberg (M), Driggers (CD) and Thomas (RA). Effects of sampling method and feed withdrawal period of recovery of microorgan-

isms from poultry carcasses. Journal of Food Protection 52(7); 1989; 480-483

Five trials were conducted to evaluate the effects of four microbiological sampling techniques for determining aerobic plate counts, presumptive coliform counts, and yeasts and mold counts of broiler carcasses. The effects of feed withdrawal period on bacterial numbers was also evaluated. Sampling methods evaluated were a surface swab technique, a whole carcass rinse procedure, a breast skin rinse procedure in which the skin was excised from the breast area, and a sample blending technique that involved breast skin excision and blending. Results from these trials indicated that the whole carcass rinse procedure yielded significantly greater recovery of aerobic mesophiles than the other methods evaluated. The recovery of coliforms was significantly greater when either the whole carcass rinse or the breast blend procedure was employed. The numbers of yeasts and molds present on the prechill carcass were extremely low, and results obtained using the various sampling methods were inconsistent. Regardless of sampling methodology and type of organism enumerated, the highest counts were obtained from broilers that had not been withdrawn from feed prior to processing. AS

177 Richter (G), Gruhn (K), Ochrimenko (C), Meixher (B) and Hennig (A). Composition and qualitative carcass characteristics of various poultry species. Nahrung 33(2); 1989; 133-144 (De).

For the broilers, hens fattening turkeys, geese, ducks and muscovy ducks produced at present in the GDR comp. and quality of the carcasses were analysed. The 20 wks old male turkeys had the highest carcass yield (81%) followed by the broilers and the 6 months old geese with 73%. For the hens and the young fattening geese was found a carcass yield of only 66%. The percentage of gizzard, heart and liver differed between 2.9% (turkeys) and 8.0% of the body wt. (young fattening geese), the percentage of abdominal fat varied from 0.5% for the turkeys to 4.7% for the 6 month old geese. The turkeys had the highest and the Peking ducks the lowest meat yield with 67-70% and 45% of eviscerated carcass. The meat was divided into breast and leg meat. The edible portion of the eviscerated carcass contained between 28% (turkeys) and 47% (Peking ducks and 6 month old geese) dry matter. The crude protein, crude fat, and ash contents varied from 15% to 20% from 7% to 32% and from 0.8% to 1.0%, resp. For the breast and leg meat, parameters of the meat quality as pH-value, colour, cooking loss, drip loss, water binding capacity and loosely bound water were determined. AS

Chickens

178 Angel (S), Weinberg (ZG) and Jaffe (R). Salt content of kosher chicken parts studied under controlled conditions. Journal of Food Quality 11(5); 1989; 365-373

Salt content in the breast, thigh and skin was determined in chickens which had been kosher-processed with different salting times, quantities and different numbers of rinses and after cooking.

Significant differences in the salt content were obtained after 1.5 h of salting. Salt quantity significantly affected only the thigh and skin. Rinsings had no effect in reducing salt content in the breast and thigh. Cooking did not reduce the salt content of the chicken except in the skin. The salt treatment used in this study, which were similar to those used in commercial kosher dressing plants, did not increase uptake of water. AS

Poultry products

Eggs

179 Roudaut (B). Residues of aminoglycoside antibiotics in eggs after medication of laying hens. British Poultry Science e 30(2); 1989; 265-271

In this study the transfer of aminoglycoside antibiotics like dihydrostreptomycin (DHS), neomycin and spectinomycin into eggs was determined separately from albumen, yolk or whole egg after their oral administration and after an intramuscular injection of DHS. Residues were then assayed by an agar plate diffusion method in cylinders with a specific test organism for each antibiotic. Results showed that in case of DHS only given by intramuscular injection left residues by the total amount of DHS excreted via the eggs to the extent of 1% of the dose administred. The residues in the eggs were detected for a period of 8 days. NGKR

180 Scott Bayer (R) and Jensen (LS). Over estimation of the cholesterol content of eggs. Journal of Agricultural and Food Chemistry 37(4); 1989; 917-920

In this paper the results of studies to evaluate the cholesterol content of eggs by the use of HPLC method and comparison with colorimetric method are presented. The results showed a cholesterol content of 10.97 mg/g of wet yolk compared to 13.86 mg/g of wet yolk as determined by colorimetric method on saponified yolk extracts. Recoveries of added cholesterol to yolk samples was almost quantitative and 17.5% of the chromogens present in the colorimetric method were in the noncholesterol fraction. It is indicated that prepurification of the cholesterol fraction from interfering chromogens is found necessary before detection by colorimetric method. NGKR

Eggs products

181 Ellison (A), Dodd (CER) and Waites (WM). Use of plasmid profiles to differentiate between strains of Bacillus cereus. Food Microbiology 6(2); 1989; 93-98

Bacillus cereus was isolated from raw and pasteurized liquid whole egg and from omelettes and retailed food which included liquid whole egg as an ingredient. Of 101 isolates, 93 contained plasmids which varied in size from 2.2 to 43 MDa and gave 10 distinct profiles. In 37 strains isolated from raw egg, 10 profiles were found in the 30 strains in which plasmids were detected. However, in 15 strains isolated after pasteurization only 2 profiles were detected, both of which were present as minor profiles before pasteurization. These proflies also formed 70% of those found in strains from omelettes manufactured at the egg pasteurization plant. Neither profile was present in 40 strains isolated from the retailed foods. Two of four food poisoning strains examined contained plasmids, one of which had a profile similar to that of a strain isolated from the raw egg. The results suggest that plasmid profiling provides a simple and rapid method for determining the source of B. cereus contamination in retail foods. AS

SEAFOODS

Fish

182 Miller (EL), Juritz (JM), Barlow (SM) and Wessels (JPH). Accuracy of amino acid analysis of fish meal by ion-exchange and gas chromatography. Journal of the Science of Food and Agriculture 47(3); 1989; 239-310

Variations in amino acid content of fish meals can be due to differences between meals or to analytical shortcomings. The purpose of the cooperative study reported here was to compare the accuracy of the ion-exchange (IE) and gas chromatography (GC) methods when applied to fish meal. The between-lab. and within-lab. variations were determined by analysing hidden duplicates of eight meals in four lab. using IE and in a further three lab. using GC. The work exposed certain pitfalls and inconsistencies in replicating results. A major source of variation in the IE method was identified as the instability of the ninhydrin reagent leading to the consequent variation in the colour yield of some amino acids which was not compensated by the use of norleucine as an internal standard. Significant between-lab. variations and fish meal x lab. interactions for certain amino acids existed. The work confirmed a need for replicate analysis of samples, whether done by IE or GC. Withour discarding any outlying values, coeff. of variation for repeatability (within-lab. variation) varied from 3.5 to 9.7% for IE and 3.5 to 8.4% (histidine at 20%) for GC. Coeff. of variation for reproducibility (between-lab variation) varied from 4.1 to 14.4% for IE and 4.5 to 11.9% (20% for histidine) for GC. The values for lysine reproducibility were 10.8% and 4.8% for methionine were 13.6% and 8.2% resp. for IE and GC. Neither of the methods was clearly superior for determining the amino acid content of fish meals. It would appear, however that the GC method tended to result in lower with-lab. variance, with arginine and histidine as exceptions. An amino acid mixture, a centrally prepared hydrolysate and a protein of known composition were also studied. AS

183 Tsai (S-F), Wang (J-H) and Jiang (S-T). Stability of muscle proteins from some subtropic fish. Journal of Agricultural and Food Chemistry 37(3); 1989; 749-752

The stability of actomyosin (AM) from some subtropic fish, tilapia hybrid (Tilapia nilotica x Tilapia aurea), tilapia (Tilapia mossambica), carp (Cyprimus carpio), and milkfish (Chanos chanos) was investigated. According to the inactivation rate constant (K_D) of AM Ca-ATPase at 0 to 45 and −10 to −40 C, the stabilities of tilapia hybrid and tilapia AMs were higher than those of milkfish and carp AMs. All AMs of these sp. were stable at pH 6.5–7.9 and had two max. CA-ATPase activities at pH 5.8–6.1 and 9.2, which were lower than other sp. inhabiting cold areas. No significant differences in K_D values among these sp. was observed when stored at −40 C for 6 months. The tilapia hybrid and tilapia were the most stable at storage temp. of −10, −20, and −30 C. AS

Herrings

184 Fichtl (P) and Schreiber (W). Curing herring fillets by means of starter bacteria. Chemie Mikrobiologie Technologie der Lebensmittel 12(2); 1989; 33-38 (De).

From genuine matje fillets a series of bacteria have been isolated, which belongs to the genus Vibrio, most of them contained cytochromoxidase. These bacteria were used for inoculating herring fillets, in the presence of 11% sodium chloride in the brine, adding furthermore glucose and nitrate. The cured fillets were tested organoleptically, their colour and ripeness proved to be much better than non-ripened herring fillets "nach Matjes Art". There seems to be opprotunity for improving the process furthermore-genuine matje fillets got still higher ratings than the experimental products. AS

Mackerels

185 Clifford (MN), Walker (R), Wright (J), Hardy (R) and Murray (CK). Studies with volunteers on the role of histamine in suspected scombrotoxicosis. Journal of the Science of Food and Agriculture 47(3); 1989; 365-375

The results are reported of single-blind, medically supervised studies in volunteers of the association between the histamine content of mackerel and the incidence of scombrotoxicosis. Volunteers consumed 25 or 50 g of fresh or spoiled mackerel containing varying quantities of endogenous or added histamine. In one study the ability of H1 and H2 histamine antagonists to modify symptoms was investigated. Objective parameters (pulse rate, skin temp. and peak expiratory flow rate) were recorded for 6 h, and subjective parameters (headache, flushing, oral tingling, visual disturbances, abdominal pain, nausea, palpitations, wheeziness, diarrhoea, flatulence, shivering and miscellaneous) for 24 h. No significant effects were observed, even with portions of spoiled mackerel containing 300 mg histamine, or mackerel from a batch which was reported to have been associated with an incident diagnosed as scombrotoxicosis. It is concluded that the precise combination of circumstances required to cause a scombrotoxic event were not reproduced in these studies, but it is tentatively concluded that histamine alone is unlikely to be the causative agent. AS

Products

Fish oils

186 Furst (F), Furst (C) and Groebel (W). Determination of polychlorinated terpenes in fish oils. Deutsche Lebensmittel-Rundschau 85(9); 1989; 273-279 (De).

A method is described for the determination of polychlorinated terpenes in cod- and halibut liver oils. Extraction and clean up of the samples were carried out according to the multi residue procedure by Specht and Tillkes. Separation and detection of the compounds were performed by use of capillary gas chromatography/mass spectrometry with negative ion chemical ionization (NICI) and selected ion monitoring (SIM). All cod- and halibut liver oils analysed so far revealed typical patterns of polychlorinated terpenes. Due to metabolism the fish oil samples showed a distinctive differences in the relative ration of the isomers compared to technical mixtures, like toxaphene or strobane, resp. An accurate quantitation of polychlorinated terpenes in samples which underwent biodegradation does not seem possible at the moment because no definite constituents but only technical mixtures are commercially available up to the present. The difficulties stemming from this are demonstrated with some examples. The method presented also records residues of higher chlorinated chlordane constituents. Levels of these compounds in fish oils are also presented. AS

PROTEIN FOODS

Infant foods

187 Li-Chan (E) and Nakai (S). Enzymic dephosphorylation of bovine casein to improve acid clotting properties and digestibility for infant formula. Journal of Dairy Research 56(3); 1989; 381-390

To improve acid clotting properties, enzymic dephosphorylation of caseins with calf intestinal alkaline phosphatase (CAP) or potato acid phosphatase (PAP) was investigated. Greater dephosphorylation was achieved using alpha$_{s1}$ - or beta-casein as substrates, compared to whole casein or skim milk. Electrophoresis of PAP-modified caseins revealed blands with lower mobility and a multibanded pattern in the beta-casein region which was similar to that of human beta-casein. On the other hand, CAP modification produced electrophoretic bands having lower mobility of the beta-casein component, but with higher mobility in the alpha casein component as well as increased net negative charge in the CAP-casein. PAP-casein formed a fine dispersion upon acidification to pH 4, with a microstructure similar to that of acidified human casein. Greater initial rates of hydrolysis by pepsin at pH 4 were observed for both CAP and PAP- modified caseins, compared to bovine and human caseins. The rate and extent of hydrolysis remained high for CAP casein but tended to level off with PAP-casein during sequential digestion with pepsin and pancreatin. There many be advantages in the use of partial dephosphorylation to improve acid clotting and digestibility properties of bovine casein for infant feeding. AS

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Alcoholic beverages

Wines

188 Lopez (LF), Lopez (AG) and Riba (MV). HPLC method for simultaneous determination of fungicides. Carbendazim, metalaxyl, folpet, and propiconazole in must and wine. Journal of Agricultural and Food Chemistry 37(3); 1989; 684-687

In this paper a simple HPLC method for simultaneous detn. of fungicides viz. carbendazim, metalxyl, folpet and propiconazole in must and wine has been described. Reversed phase column (spherisorfo DS-1C_{18}) with an acetonitrile water gradient as mobile phase are used for the analyses. Absorbance at 220nm is recorded as compounds are separated and this method provided minimum detectable levels between 4 and 8 μ g/L for the above four fungicides. NGKR

Palm wines

189 Cunningham (AB) and Wehmeyer (AS). Nutritional value of palm wine from Hyphaene coriacea and Phoenix reclinata (Arecaceae). Economic Botany 42(3); 1988; 301-306

Nutritional data of palm wine from Hyphaene coriacea and Phoenix reclinata showed that palm wine is an important source of nicotinic acid and vitamin C. BV

Non-alcoholic beverages

Coffee

190 Aeschbacher (HU), Wolleb (U), Loliger (J), Spadone (JC) and Liardon (R). Contribution of coffee aroma constituents to the mutagenicity of coffee. Food and Chemical Toxicology 27(4); 1989; 227-232

In this study about 40 coffee aroma constituents belonging to the classes of dicarbonyls, sulphur compounds, furfuryls, N-heterocyclics and others were systematically evaluated in three Ames Tester strains. It was seen that only aliphatic dicarbonyl compounds showed notable direct mutagenic activity and very weak effects were also seen with some N-heterocyclics which do not contribute substantially to the mutagenicity in coffee. The absence of coffee mutagenicity/carcinogenicity in rodents with these highly reactive coffee aroma compounds can be explained in part by detoxification of microsomal enzyme systems. NGKR

191 Blanc (MB), Davis (GE), parchet (J-M) and Viani (R). Chromatographic profile of carbohydrates in commercial soluble coffees. Journal of Agricultural and Food Chemistry 37(4); 1989; 926-930

This study was undertaken to detect adulteration in commercial soluble coffee preparations by estimation of free and total sugar contents. Pure soluble coffee is found to contain about 0.3% total xylose and sucrose and about 2% total glucose but no maltose. Presence of total xylose indicated extraction of coffee with husks/parchments whereas presence of high level of free fructose and glucose indicated either raw or roasted husks/parchments being added. Higher levels of maltose and total glucose showed addition of maltodextrins and higher levels of sucrose and total glucose showed addition of caramalised sugar. NGKR

Fruit juices

192 Baumann (G) and Gierschner (K). Manufacturing of clear fruit juices by means of ultrafiltration. New developments. Deutsche Lebensmittel-Rundschau 85(11); 1989; 344-350 (De).

Apple juices

193 Sandhu (KS), Singh (S), Singh (N), Sekhon (KS) and Bawa (AS). Effect of pectic enzyme treatment on juice yield and composition. Indian Food Packer 43(6); 1989; 12-14

Juice recovery from apple on treatment with pectic enzyme was evaluated. The grated pulp of 'Maharaji' and 'Red Delicious' apple was treated with 0.3% pectic enzyme after addition of 150 p.p.m. potassium metabisulphite, incubated for 30h at 20-25 C the juice extracted with hydraulic press, and pasteurized at 80 C for 5 min. The juice recovery increased by 20.07% in the 'Maharaji' var. and by 9.79% in 'Red Delicious' var. with pectic enzyme treatment. The proximate constituents in pectic enzyme extracted juice were higher. The enzyme treatment resulted in a clear juice but the browning was increased. KAR

Citrus juices

194 Bhalerao (SD) and Mulmuley (CV). Dehydrated citrus pips. A valuable adjunct for dry beverage mixes. Indian Food Packer 43(6)20-23;

The soft drinks prepared from the concentrated powders lack the feel of natural juice. To make up this deficiency, dry citrus juice sacks (pips) were prepared for incorporation in these mixes to enhance the consumer appeal. The lime juice and orange juice pips dried (fluidized bed drying and osmotic drying), sieved, packed in 200 gauge polyethene bags and stored under ambient conditions (15-40 C, 20-93% R.H.) retained their quality for more than a year. Osmotically dried product rehydrated immediately and the fluidized bed dried products took 5 min at room temp. Addition of 0.01% (w/v) of dry pips or 0.05% (w/v) of osmo-dried pips gave desired appearance and mouthfeel to the final drink as judged by sensory evaluation.

The dry pips stored for a period of more than one yr and retained all the quality attributes. The fluidized bed dried lime pips cost Rs. 80/- and·orange pips cost Rs. 100/- per kg. VKR

Grapefruit juices

195 Johnson (RL) and Chandler (BV). Kinetic studies of adsorption of bitter principles and titratable acid from grapefruit juice. Journal of Chemical Technology and Biotechnology 44(3); 1989; 225-236

Measurement of the initial rates of removal of limonin and naringin from grapefruit juices by several polytyrene and polyacrylic adsorbents has allowed these absorbents, in the forms as supplied, to be ranked in their order of kinetic effectiveness for removal of the two bitter principles between juice and polystyrene adsorbent resins show that the capacity of such resins for naringin increases with specific surface area, but the capacity for limonin appears to increase with specific pore vol. With respect to titratable acid, the two weak base resins, Amberlite IRA-93 and Duolite A378, were equally effective both kinetically and in their capacity for titratable acid; both absorbed somewhat less than 1 mol of titratable acid from grapefruit juice per equivalent of weak base resin. AS

196 Rouseff (RL), Fisher (JF) and Nagy (S). HPLC separation and comparison of the browning pigments formed in grapefruit juice stored in glass and cans. Journal of Agricultural and Food Chemistry 37(3); 1989; 765-769

A procedure was developed to allow characterization of the browning pigments formed in grapefruit juice and also to study the variations due to container, temp. and time of storage. These pigments were separated by an HPLC procedure using a ternary solvent gradient with a C$_{18}$ column. This system consisted of water, acetonitrile and tetrahydrofuran. The type and quantity of pigments depended on the container and more were formed in bottles than in cans. Some pigments were seen to be unstable and disappeared due to longer storage periods while some increased with storage periods. The browning was due to these pigments both in cans and bottles and temp. also increased the browning pigments. NGKR

Orange juices

197 Aristoy (MC), Orlando (L), Navarro (JL), Sendra (JM) and Izquierdo (L). Characterization of Spanish orange juice for variables used in purity control. Journal of Agricultural and Food Chemistry 37(3); 1989; 596-600

This investigation was carried out to determine amino acids, sugars, minerals, ash, citric and isocitric acid and spectral characteristics of Spanish pure orange juices and their variations due to season and var. For this study 147 samples of orange conc. of 65 Brix obtained from white and Navel oranges collected in Spanish citrus plants from December to May during two crop seasons and stored at -18 C. After reconstitution to 11 Brix with redistilled water the analyses were performed by standard procedures. From the results the differences were found to be significant at 99 % level and the samples cannot be considered a unique references population to detect dilution and were also poor and erroneous. Both problems could be avoided by considering independent populations corresponding to the different seasons and groups var. NGKR

198 Sattar (A), Durrani (MJ), Khan (RN) and Hussain (B). Effect of different packages and incandescent light on HTST-pasteurized single strength orange drink. Chemie Mikrobiologie Technologie der Lebensmittel 12(2); 1989; 41-45

Effect of incandescent light on HTST pasteurized single strength orange drink (SSOD) packed in clear, green and amber glass bottles and coextruded wax laminated paper (Tetra Pak), was studied during 32 days storage at ambient room temp. chemical analysis revealed significant effect of packages and light on different quality parameters during storage ($P < 0.05$). Ascorbic acid losses were found to be 66.0, 59.9, 5.19, and 50.3% in clear glass, green glass, Tetra pak, and amber glass resp. against 42.4% in the unexposed control during the entire storage. Titratable acidity, Brix, and light transmission generally showed an increasing pattern with advanced storage. Brown glass provided the best protection followed by Tetra-Pak, green glass, and clear glass. Evaluation of juice for sensory components revealed a congruent pattern of changes in the ratings in relation to different packages. AS

Tea

199 Owuor (PO) and Othieno (CO). Effects of maceration method on the chemical composition and quality of clonal black teas. Journal of the Science of Food and Agriculture 49(1); 1989; 87-94

Crush, tear and curl maceration improved the theaflavin and thearubigin contents and briskness, 'brightness' and 'thickness' of black teas (Camellia sinensis (L) O Kuntze), whereas orthodox manufacture produced teas with larger amount of caffeine and Groups I and II volatile flavour compounds, and with a better flavour index and superior flavour. Thus orthodox manufacture was found to produce better flavour teas whereas crush, teas and curl manufacture produced better plain teas. Clonal differences in all the chemical quality parameters were noted. AS

200 Ullah (MR), Gogoi (N) and Baruah (S). A rapid method for extraction and spectrophotometric determination of caffeine in tea. Two and a Bud 34(1-2); 1987; 50-53

An ultraviolet spectrophotometric method which is simple and rapid has been developed for the estimation of caffeine in tea (Camellia sinensis). Caffeine was extracted from tea samples with alkaline methenyl chloride and the recovery of caffeine was exhaustive and complete. The standard curve over the concn. range of 2 to 6 μ g/ml against the observed Q.D. at 276 nm was found to correspond to g caffeine/100 g of tea sample. Hence the % of caffeine in the sample could be directly read from the standard curve. The value for caffeine. was in good agreement with that determined gravimetrically. This method could be adopted for routine detn. of caffeine in black tea, instant tea and dried green tea leaf. KAR

FATS AND OILS

201 Chakrabarty (MN). Biotechnology in the oils and fats industry. Science and Culture 55(7); 1989; 224-227

A short review which covers aspects like application of lipase; fat splitting; interesterification, ester synthesis; modification of fatty acids, oxidative reaction and biohydrogenation. KAR

202 Eggers (R) and kaschel (G). Deformation characteristics of oilseeds during pressing process. FAT Science and Technology 91(6); 1989; 213-219 (De).

Up to now the deformation of compactable fixed beds made of natural material is described by the well-known press-equation. The specific quantities "proportion of radial to axial pressure" and the "coeff. of friction" are nearly unknown. By using rapeseed of different condition, the deformation characteristic is going to be determined in a special test apparatus by taking up axial-and radial pressure profils. Thus the proportions or radial to axial pressure and the coeff. of friction can be derived. The results are to be considered as a contribution to design gas sealing sections for continuous transport of seeds through pressure vessels. At the same time in order to facilitate comprehension of the events happening at solid/liquid separation by expression processes, the influence of the contents of seed oil under compressing by mechanical pressure is checked. AS

Fats

203 Blekas (G) and Boskou (D). Oxidation of stigmasterol in heated triacylglycerols. Food Chemistry 33(4); 1989; 301-310

A triacylglycerol mixture containing 5% stigmasterol by wt. and devoid of other unsaponifiables was heated at 180 plus or minus 5 C for several h. Oxidation products from stigmasterol were separated and isolated by column chromatography and preparative thin-layer chromatography. Characterization of individual compounds was based on chromatographic mobilities, specific colour reactions, UV and IR spectroscopy and fragmentation patterns from the mass spectra of the purified oxidation products. A hydrocarbon (stigmasta-3, 5, 22-triene), a triunsaturated ketosteroid (stigmasta-3, 5, 22-triene), a diunsaturated ketosteroid (stigmasta-4, 22-dien-3-one) and a pregnane derivative (Delta - pregnen-3beta-ol-2-one) were identified. There is also evidence for the presence of more polar compounds such as hydroxy and epoxy derivatives. AS

204 Zsinka (AJN), Peredi (J), Szepvolgyi (J), Maucha (E), Foldes (V) and Biro (G). Effect of interesterified fat mixtures on certain lipid indices in experimental fat metabolism disturbance. Nahrung 33(2); 1989; 107-118

Butter oil

205 Christen (GL). A method to quantify butteroil added to butter-margarine blends. Journal of Food Quality 11(6); 1989; 453-459

Table spreads containing various amounts of butteroil blended with vegetable oils are now commercially available. The butter fat percentages in these blends range from 2-4% according to the label information. This research was designed to determine the efficacy of a gas chromatographic procedure for monitoring the quantity of butteroil in the blend. Methyl esters were formed using potassium methoxylate as a catalyst and a heating interval of 2 min at 65 C in a closed vial under a N atm. Carbon disulphide was used to extract the fatty acid methyl esters which were then separated by capillary gas chromatography. Retention times, peak areas and relative concn. were determined by an integrator connected to the chromatograph. Changes in chromatographic patterns were monitored as known wt. of butteroil were added to melted margarine. Dodecanoic, tetradecanoic, and pentadecanoic acids increased proportionately as butteroil was added to margarine. Commercial butter-margarine blends were prepared using the same procedure and the quantity of butteroil present was predicted by regression analysis. AS

Butterfat

206 Miyamoto (T), Nakae (T) and Nakazawa (Y). Oxidation of double bonds in unsaturated fatty acids of butterfat. Lebensmittel-Wissenschaft und-Technologie 22(3); 1989; 107-111

Various kinds of acids assumed to be monocarboxylic and diacarboxylic acids produced by oxidation of butterfat were examined by gas chromatography and gas chromatography-mass spectrometry. Odd number in carbon of fatty acids hardly known to exist in ordinary butterfat was observed in the oxidized products. The origin of newly-formed acids was estimated and the quantitative ratio of them was calculated as an index. This index is considered to represent the characteristics nature of various animal and vegetable fats and oils, and also to provide new detection methods of adulteration and characterization of fats and oils. AS

Oils

207 Jackman (RL), Yada (RY) and Paulson (AT). Characterization of the kinetics of breakdown of protein stabilized oil in water emulsions. Journal of Agricultural and Food Chemistry 37(3); 1989; 600-604

The breakdown of oil in water emulsions, after initial formation, in the presence of 0.1% (w/v) whey, potato, pea, or soy proteins at pH 4-8 was monitored by measuring the absorbance at 500 nm of emulsions diluted in 0.1% (w/v) SDS after various time periods. Emulsion breakdown/absorbance decay was asymptotic, decreasing to an equilibrium value that was pH and protein dependent. Application of nonlinear modeling techniques revealed breakdown of protein-stabilized emulsions to follow first-order kinetics ($P < 0.001$). Use of a two-phase first-order model to characterize emulsion breakdown is also discussed. Results from this study emphasize the need to use appropriate statistical techniques to analyze replicated emulsion breakdown data; failure to do so could lead to biased estimates of kinetic parameters. AS

208 Sattar (A), Jan (M), Ahmad (A), Hussain (A) and Khan (I). Light induced oxidation of nut oils. Nahrung 33(2); 1989; 213-215

The nuts are invariably sun-dried in Pakistan, Iran, Afghanistan and adjoining areas of China and USSR. Their oils are generally kept in the unrefined form, being exposed to light during subsequent handling or marketing and consequently undergo changes in colour, flavour and chemical changes. Light induced reactions have been found to damage the quality and stability of edible oils, fats and fat containing food products. Oil characteristics of walnuts. and oxidation of almond and walnut oils during heating have been studied. Influence of clear flexible pouches and amber-colour bottles on storage behaviour of groundnut oils was reported by Mahadevaiah etal. and Nasirullah etal. Dry nut oils are generally sold in clear glass bottles in Pakistan and several other countries but their stability to fluorescent light in relation to different packages has not been tested, which is the object of these studies. AS

209 Welsh (FW) and Williams (RE). The use of vegetable oils to recover compounds from aqueous solutions. Journal of Chemical Technology and Biotechnology 46(3); 1989; 169-178

Corn oil, canola oil, olive oil, sunflower oil, peanut oil and soybean oil were tested as extractants for the recovery of organic compounds from aqueous solution. Short chain aliphatic alcohols and acids were poorly recovered ($K_d < 1.0$) while most esters, aldehydes and aromatic compounds tested were satisfactorlly recovered ($K_d > 2.0$) from aqueous solution by vegetable oils. K_d is defined as the ratio of the concn. of the dissolved substance in the extractant to that in the aqueous phase. The exception was caffeine which was poorly extracted from water. The type of oil used appeared to have limited effect on K_d . Increasing the reaction temp. resulted in increased K_d for most readily extractable compounds. Acidulated fatty acid was also tested as an extractant. Although it generally resulted in a greater K_d than the oils or hexane control, acidulated fatty acid was less desirable as an extractant because it tended to create an emulsion with the aqueous phase under the test conditions. AS

Coconut oils

210 Lim-Sylianco (CY). Inhibition of chemical carcinogenesis by coconut oil. ASEAN Food Journal 4(3); 1989; 93-97

Results indicate that the reactivity of the different mutacarcinogens with DNA was inhibited by coconut oil. The initiation stage, the alteration of DNA structure, can be inhibited by coconut oil. SRA

Palm oils

211 Sundram (K). Inhibitory effect of palm oil on cancer progression. ASEAN Food Journal 4(3); 1989; 87-91

Palm oil has been shown to have an inhibitory effect on cancer development but the actual mechanism of this inhibitory action is poorly understood. The fatty acid comp. of palm oil is more favourable than polysaturated oils in inhibiting tumar progression. The tocopherols, tocotrienols and carotenoids protect against membrane peroxidation and free radical formation. The effectiveness of these two co-existing vitamins in possibly combating tumorgenesis in still unknown. Palm oil may be proven to be protective is cirbain carcinogenic environments. SRA

Soybean oils

212 Guth (H) and Grosch (W). 3-methylnonane-2,4-dione-an intense odour compound formed during flavour reversion on soybean oil. FAT Science and Technology 91(6); 1989; 225-230

213 McDonald (RE), Armstrng (DJ) and Kreishman (GP). Identification of trans-diene Isomers in hydrogenated soybean oil by gas chromatography, silver nitrate thin-layer chromatography, and ^{13}C NMR spectroscopy. Journal of Agricultural and Food Chemistry 37(3); 1989; 637-642

Soybean oil was hydrogenated with use of a sulphur-containing nickel catalyst to produce high levels of trans-diene isomers. The isomers were derivatized to methyl esters and then fractionated by preparative silver nitrate thin-layer chromatography (TLC). Each TLC band was recovered and analyzed by capillary gas chromatography (GC). The identity of specific trans-dienes was confirmed by ^{3}C nuclear magnetic resonance (^{13}C NMR). Packed-column GC using a 6.1 m x 2 mm OV-275 column gave an accurate indication of the total amount of trans-dienes present, while a 50 m x 0.22 mm capillary column containing (cyanopropy) polysiloxane separated the individual trans-diene isomers. By ^{13}C NMR, the three major trans-diene isomers were identified as cis-9, trans-12-octadecadienoic acid, trans-9, cis-12-octadecadienoic acid, and trans-9, trans-12-octadecadienoic acid. AS

SPICES AND CONDIMENTS

Spices

214 Blenford (D). Open sesame. Food 11(6); 1989; 27-28

This is a general article on different types of spices, their importance and applications. The spices include black pepper, ginger, nutmug, cinnamon, sage, chillies, funugreek etc. SYR

215 Sambaiah (K) and Srinivasan (K). Influence of spices and spice principles on hepatic mixed function oxygenase system in rats. Indian Journal of Biochemistry and Biophysics 26(4); 1989; 254-258

The status of hepatic mixed function oxygenase system (MFOS) was investigated in rats fed spice principles: capsaicin at 3 and 15 mg %, piperine at 4 and 20 mg % and curcumin at 0.1 and 0.5% as well as spice: cumin at 0.25 and 1.25%, ginger at 10 and 40 mg %, fenugreek 0.5 and 2.0%, cinnamon 10 and 50 mg %, asafoetida at 50 and 250 mg %, mustard at 50 and 250 mg % and tamarind at 0.5 and 2 5%. Liver microsomal cytochrome P_{450}- dependent aryl hydroxylase was generally stimulated by these spice principles and spices. Cumin, ginger and fenugreek also stimulated the levels of cytochrome 450 and cytochrome b^{5} and cumin and tamarind stimulated N-demethylase activity. NADPH-cytochrome C reductase and glucuronyl transferase activities, however, remained unaffected by the spice tested. KAR

Curcuma

216 Srinivasa Rao (A), Rajanikanth (B) and Seshadri (R). Volatile aroma components of Curcuma amada Roxb. Journal of Agricultural and Food Chemistry 37(3); 1989; 740-743

In this study the aroma conc. of fresh rhizomes of Curcuma amada Roxb. was prepared by an efficient steam distillation/solvent extraction simultaneously. The qualitative analysis of these volatile aroma compounds was done by GC/MS aided by computer library research. 61 compounds earlier unreported out of 68 compounds have been identified and their mass spectra recorded and confirmed by their Kovats Indices. It was seen that the aroma conc. of mango ginger comprised a mixture of characteristic impact compounds of both raw mango and turmeric. NGKR

Garlic

217 Yu (T-H), Wu (C-M) and Chen (S-Y). Effects of pH adjustment and heat treatment on the stability and the formation of volatile compounds of garlic. Journal of Agricultural and Food Chemistry 37(3); 1989; 730-734

In this study the effects of pH adjustment after blending 30 min standing and heat treatment of garlic cloves on the stability and the formation of volatile compounds of garlic were determined by GC. It was seen that the amount of the two isomeric cyclic compounds 3-vinyl-4 H-1, 2 dithiin and 2-vinyl-4 H-1, 3 dithiin which were artifacts from allicin decreased with increasing pH values whereas the amount of diallyl disulphide propenethiol, propyl allyl disulphide and diallyl sulphide increased with increasing pH values. Formation of diallyl trisulphide, methyl allyl trisulphide, 1, 3-dithiane, 2, 4 dimethylfuran, aniline, and tran-1-propenyl methyl disulphide were preferred in rentral-conditions whereas formation of methyl allyl disulphide, methyl allylesulphide, 1-2-epithiopropane, and methyl propyl disulphide were preferred around pH 9.0. NGKR

218 Yu (T-H), Wu (C-M) and Liou (YC). Volatile compounds from garlic. Journal of Agricultural and Food Chemistry 37(3); 1989; 725-730

In this paper the studies on the constituents of garlic oils, their essential oil identification together with comparitive data on their comp. by different extraction techniques. The volatile oils were extacted by water distillation, steam distillation and L-N distillation/solvent extraction with/without steam resp. The volatile oils were analysed and identified by capillary GC and combined GC-MS and the yield of garlic oil was found to be 0.22 plus or minus 0.01% (w/w). The comp. revealed monosulphides, disulphides, and trisulphides and for the first time 13 out of 28 components were reported. The essential oils obtained by L-N distillation, solvent extraction contained more 2-4-dimethylfuran, 2-propen-1-ol, anilin, and 3-5 diethyl-1,2, 4-trithiolane than those from water distillation and steam distillation. The essential oils obtained from steam distillation contained more high volatility compounds and less low volatility compounds than those by water distillation. NGKR

Laser trilobum

219 Akgul (A). A new spice from Turkey Laser trilobum (L). Borkh. I. Inhibitory effect on food contaminating microorganisms. Acta Alimentaria 18(1); 1989; 65-69

The sensitivity of thirty foodborne microorganisms to a new spice, the fruit of Laser trilobum (L.) Borkh., the essential oil, and one of its main constituents, perillaldehyde, were studied in culture media. At ground spice concn. of 1.0-4.0%, bacteria and yeasts were more sensitive than moulds tested. The essential oil at 0.01-0.1% exerted a weak inhibitory effect on all organisms. A concn. of 0.1% of perillaldehyde inhibited completely the growth of the moulds and bacteria studied, except Pseudomonas aeruginosa, while it showed slight activity on yeasts. In general, ground spice exhibited a higher antibacterial and anti-yeast activity than essential oil and perillaldehyde. It was also concluded that the antimicrobial property of the spice depended also on non-volatile constituents. AS

SENSORY EVALUATION

220 Nasrawi (CW) and Pangborn (RM). The influence of tastants on oral irridation by capsicin. Journal of Sensory Studies 3(4); 1989; 287-294

The present study reports on the influence of tastants (sucrose, NaCl and citric acid) and solution viscosity (xanthan gum) on perceived intensity of mouth burn of capsicin by caters and non caters of chillis. Oral irradiation from solution of 2 p.p.m. capsacicin, capsaicin with added sucrose (0.04 M), NaCl (0.3 M) and citric acid (0.01 M) or xanthan gum (0.2%). It was found that only sucrose decreased mouth burn both in quality and duration whereas the viscosity imparted by xanthan retarded mouth-burn but not its duration. This showed that eaters and non-eaters of chillis did not differ in their perception of mouth-burn. NGKR

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

221 Yang (RZ) and Tang (CS). Plants used for pest control in China. A literature review. Economic Botany 42(3); 1988; 376-406

In this review information on the use of herbal pesticides in China, primarily from the late 1950's is summarized. A table containing 267 pesticidal plants is compiled to provide a glimpse of the Chinese experience. 30 references. BV

BIOCHEMISTRY AND NUTRITION

222 Muzaffar (M), Bakhsh (R), Khan (S) and Salecm khan). Effect of different dietary brans on lipid metabolism in male albino rats. Nahrung 33(2); 1989; 167-170

Male albino rats were fed different dietary brans at 20% level for two months to study their effect on lipid metabolism. Wheat and corn brans significantly ($P < 0.05$) decreased the serum cholesterol level while chickpea bran significantly ($P < 0.05$) lowered the liver and heart cholesterol concn. Significant ($P < 0.05$) reduction was observed in liver and heart triglyceride with all brans. Wheat, corn and chickpea brans fed at 20% level had no significant effect on serum triglyceride concn. AS

223 Schulze (J) and Friedrich (M). Physicochemical properties of dietary fibre. One basis of action. Ernahrungsforschung 33(3); 1988; 49-51 (De).

Chemical structure, texture and physical properties of dietary fibre are responsible for its actions in the GI tract. Particular properties are water holding, gelling activity, cation and sterol binding. Resulting effect already set in both stomach and small intestine and continue partially during the passage through the large intestine. They influence the metabolism of macroorganism. Some dietary fibre actions are explicable by physicochemical properties. Hypothesises are discussed. AS

224 Schulze (J), Zunft (H-J), Friedrich (M) and Haenel (H). Dietary fiber in our food. Ernahrungsforschung 33(1); 1988; 4-6 (De).

Dietary fibre belongs to that kind of food components, which escapes principally (obligatory dietary fibre) or under special conditions (potential dietary fibre) from the digestion in the small intestine. It originates almost exclusively from vegetable food constituents. In this connection amorphous ground substances, the main components of which are pectins, hemicelluloses, celluloses and lignins, are of special importance. Vegetable gums, swelling agents and mucoids, sustentacular substances as well as microbial polysaccharides and chemically modified polysaccharides also gain in importance as auxiliary materials in food technology. An increase in dietary fibre intake up to the internationally generally recommended minimum quantity of 30 g/day can only be reached with an increased intake of cereal wholemeal products as well as of fruits and vegetables. AS

225 Breton (C), Phan Thanh (L), Dubray (G) and Paraf (A). Apparent discrepancies between immunochemical methods used for ovalbumin recognition in food. Journal of the Science of Food and Agriculture 47(3); 1989; 311-325

The specificity of rabbit anti-native ovalbumin antibodies against native ovalbumin (NOA) or heat-denatured ovalbumin (HDOA) was studied by affinity chromatography ELISA techniques, quantitative immunoprecipitation and HPLC. Affinity-purified antibodies were prepared either by passing antisera successively on an NOA column and an HDOA column, or vice versa. Antisera were found to contain about 85% of antibodies directed against NOA, 7% specific for HDOA and 8% retained by both columns. It is shown that antibodies specific for NOA fully precipitated NOA in liquid-phase precipitation but were unable to bind NOA is ELISA using NOA-coated plates, while recognising NOA trapped on the solid phase by a first layer of antibodies:ovalbumin was thus completely denatured during interaction with plastic as shown also by the fact that antibodies specific for HDOA reacted with NOA-coated plates. These results point out the need to modify ELISA tests for monoclonal antibodies selection and for structural studies of food molecules in complex mixtures. However, this observation, which holds true for ovalbumin, might not apply to all antigens. AS

226 Nishimura (T) and Kato (H). Taste of free amino acids and peptides. Food Reviews International 4(2); 1988; 175-194

This review covers taste of free amino acids and peptides (sweet, bitter, sour, salty, umami and other tastes) and role of free amino acids and peptides in food taste. 80 references. SRA

227 Erdman (JWJr). Nutrition. Past, present and future. Food Technology 43(9); 1989; 220-226

This review focuses on advances in the field of nutrition during the past 50 yrs. The present status of nutritional sciences and fertile areas for future nutrition research and policy is also emphasized. 17 references. SRA

228 Horie (Y), Wahlqvist (ML), Read (RSD) and JonesGP). Dietary fibre contents of some traditional Japanese foods. ASEAN Food Journal 4(3); 1989; 117-119

229 Ramesh Puri and Tejinder Sanghera. Nutritive value and consumption pattern of some processed foods. Indian Food Packer 43(6); 1989; 24-28

The survey on consumption of processed mixed fruit jam, orange squash and pineapple juice was conducted on 200 households in Chandigarh city, India. These comprised of three socio-economic groups (middle income with Rs. 500/-; high-middle income with Rs. 501-1,000 and high income with Rs. 1000 and above per capita per month). Jam was popular in all households irrespective of income, though a linear increase was observed with education of women and family income. Orange squash consumption was max. in high middle income and pineapple juice consumption showed an increase with a rise in income. The consumption of these processed foods showed a linear increase with higher education of women. These convenience foods could be used where a low protein, low fat and high calorie diet is required. VKR

TOXICOLOGY

230 Brunn (H), Georgii (S), Stelz (A) and Muskat (E). Xenobiotics in foodstuffs-estimation of daily food intake. II. Determination of polychlorinated biphenyl in invalid diets and body foods. Deutsche Lebensmittel-Rundschau 85(9); 1989; 286-290 (De).

Six selected PCB-congeners and 2,2',4,4' -tetrachlorobiphenyl (congener No. 49) were determined in the daily diet of three German hospitals and in baby food. The congeners Nos. 101, 153, 138 and 180 could be proven in most samples. The low chlorinated biphenyls (congeners Nos. 28, 49, and 52) were under the detection limit. Based on these results the average daily intake was estimated with help of model calculations at 4.1 μ g PCB (sum of the congeners), or 0.06 u g/kg PCB in relation to the body wt. The equivalent daily intake for a six month old child is 0.13 μ g/kg PCB per body wt. These results show that the average daily intake of the polychlorinated biphenyls are still far below the at present discussed acceptable daily intake of 1 µg/kg per body wt., and that the intake due to polychlorinated biphenyls in foodstuff has decreased in the last yrs. AS

231 Hall (RL) and Taylor (SL). Food toxicology and safety evaluation. Changing perspectives and a challenge for the future. Food Technology 43(9); 1989; 270-279

Article deals with the genesis of food toxicology, evolution of toxicology testing and interpretation, factors shaping food toxicology, food toxicology today, problems of today and the challenges of the future. 26 references. SRA

FOOD LAWS AND REGULATIONS

232 Hutt (PB). Regulating the misbranding of food. Food Technology 43(9); 1989; 288, 290-295

233 Middlekauff (RD). Regulating the safety of food. Food Technology 43(9); 1989; 296-297, 300-307

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GENERAL

234 Bord (RJ) and O'Connor (RE). Who wants irradiated food? Untangling complex public opinion. Food Technology 43(10); 1989; 87-90

The research reported here demonstrates that the extent and degree of public acceptability of irradiated foods depends to a significant extent on what questions are asked and how the answers to those questions are interpreted. Covers background to public acceptability, problems in measuring public acceptance, research methods, analysis of results and pattern of results. 15 references. SRA

235 Chaudhuri (S). The market for processed foods in India. Indian Food Industry 8(3); 1989; 10-12

236 De Clemente (IM), Valletrisco (M) and Niola (I). Characterization and suitability in the use of a new frying product. Industrie Alimentari 28(270); 1989; 372-374 (It).

The authors, who have already studied the problem of the stability of edible oils in thermal treatment, characterise a product recommended specifically for frying purposes. They compare the chromatographic properties and the state of oxidation by means of the Oxifrit-Test. AS

237 Holmes (A). Technology in the year 2000. Food Manufacture 64(1); 1989; 25-28

Changes expected over the next 12 yrs in Food Technology is outlined with factors like consumer demands, forecasting the future, meeting the challenge, meeting the companies needs and technical resources. SRA

238 Ibiyemi (SA), Ehusani (RO), Amaorgu (FB) and Atteh (JA). Studies of the thermal effect on Parkia seeds. Food Chemistry 33(3); 1989; 165-171

Fruits from Parkia filicoideae Welch plant provided the raw seeds was investigated. Portions of the seeds were processed by boiling in water; others were roasted in an oven at 100, 120, and 150 C to obtain beans that were further processed to obtain their oils and seed cakes. The physico-chemical analytical data obtained for the various oils and seed cakes suggest that processing of the seed at 120 C is most suitable to obtain parkia beans of the highest quality. Results obtained from both in vivo and in vitro digestibility studies confirm that seeds processed at 120 C dry-heat produced the best quality beans. AS

239 Peri (C). Permanent education and training programs for the technical staff of food industries. Industrie Alimentari 27(262); 1988; 1065-1068 (It).

Permanent educational programs are essential to keep abreast of technological progress in food industry. Moreover, improvement of staff's knowledge and culture greatly contributes to people motivation, performance, and satisfaction. The paper illustrates some principles which should be taken into consideration when organizing training courses for the technical staff of a food factory. General topics are also suggested as possible guiding thread and teit-motiv of training programs as for example safety or sensory quality of food. The author wishes that Italian food industries more frequently and systematically resort to such programs especially when they dynamic industry-relationship, as it is in the case of the Biagini Food Safety Division, programs. AS

240 Schutz (HG), Bruhn (CM) and Diaz-Knauf (KV). Consumer attitude toward irradiated foods. Effects of labelling and benifits information. Food Technology 43(10); 1989; 80-86

The purpose of this research is to investigate the effect of label statements and other information regarding the benefits of irradiations on consumer attitudes. Using a national sample, evaluated irradiation awareness and concern, the influence of FDA approval, the influence of label statements on judgements of quality, freshness perception, price expectation, safety, willingness to purchase and the interest in purchase of specific irradiated foods when benefits are given. SRA

FOOD PROCESSING

241 Kroll (J). The application of ultrafiltration in production and processing of food raw material and additives. Ernahrungsforschung 34(3); 1989; 83-86 (De).

During the last few yrs methods used to separate mixtures of mol. substances by semipermeable membranes have steadily gained technical and economic importance. In particular, ultrafiltration (UF) has been introduced in the food industry. The results of the investigations presented include the use of UF for concn. purification and detoxification of solutions of plant and animal proteins (rapeseed, blood plasma of slaughtered cattle) as well as important functional properties of the protein fractions obtained. AS

242 Zadow (JG). Supercritical fluid extraction new technology for the food industry. CSIRO Food Research Quarterly 48(2); 1988; 25-32

The author reviews the application of supercritical fluid extraction to a range of foodstuffs, with reference to deodourization and fractionation specific to food processing applications as coffee decaffeination, hop extraction, essence removal and oil fractionation.

Impediments to commercialisation and process potential are also considered. 15 references. SRA

Extrusion

243 Fitchali (J) and van de Voort (FR). Fundamental and practical aspects of twin screw extrusion. Cereal Foods World 34(11); 1989; 921-929

This feature article discusses both basic fundamental as well as practical aspects of extrusion. The article provides brief information on extruder types and operational characteristics, residence fiber distribution, process variables and process control and modelling and optimization. PHR

244 Hauck (BW) and Huber (GR). Single screw vs twin screw extrusion. Cereal Foods World 34(11); 1989; 930, 932-934, 936-993

This article provides information on advantages of extrusion process description, and comparative advantages and disadvantages of single and twin screw extruder. PHR

245 Padmanabhan (M) and Bhattacharya (M). Extrudate expansion during extrusion cooking of foods. Cereal Foods World 34(11); 1989; 945-949

This feature article discusses the factors influencing the extrudate expansion of food. The article develops a physical picture of the interplay of the elastic and moisture effects on extrudates expansion. The article also covers a mathematical model for the extrudate expansion. PHR

FOOD PACKAGING

246 Saguy (I) and Kiploks (EM). Revolution counter for food containers in an agitating retort. Food Technology 43(11); 1989; 68-70

The purpose of this work is to design a device which would allow the measurement of can revolution within the steritort. The result of this research can be utilised to demonstrate the effect of different can/lid material, finish, and configuration on the axial can rotation and process safety. SRA

Packaging materials

247 Holland (R) and Santangelo (R). The Laminate Film' method for measuring odour transmission rate through food packaging films. CSIRO Food Research Quarterly 48(2); 1988; 40-46

FOOD ENGINEERING AND EQUIPMENT

248 Miyawaki (O), Abe (T) and Yano (T). A numerical model to describe freezing of foods when supercooling occurs. Journal of Food Engineering 9(2); 1989; 143-151

A universal numerical model for freezing of food materials is proposed. This model is applicable to semi-infinite and finite cases, covering the effects of supercooling and the temp.-dependence of the fraction of frozen water present. To describe supercooling, a three-step freezing model is proposed. Theoretical predictions agree well with experimental results for samples of various shapes and comp. Duration of supercooling, the only variable which should be determined experimentally, was related statistically to coolant temp. AS

Drying

249 La Rocca (V), Panno (G) and Pignato (L). Some applications of the vapour compression heat pumps in the food products drying. Industrie Alimentari 28(270); 1989; 385-388, 391 (It)

A comparison of the classical drying process and the drying process by heat pump exploitation is reported. Results indicate that in many cases the exploitation of heat pumps offers practical and economic advantages. BV

Equipments

250 Fell (J). Problems with powder. Food Manufacture 64(1); 1989; 39, 41

Equipments used for handling, weighing and mixing powdered and granular products are reviewed. SRA

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

Chemistry

251 Cilliers (JJL) and Singleton (VL). Non-enzymic autoxidative phenolic browning reactions in a caffeic acid model system. Journal of Agricultural and Food Chemistry 37(4); 1989; 890-896

Non-enzymic oxidation of caffeic acid was studied at pH 4.0-8.0, at various concn. (1-10 mM) and at temp. 5, 20, and 35 C. The products of caffeic acid oxidation were investigated by high-performance liquid chromatography (HPLC) with diode array detection. The proportion of different oxidation products formed from the caffeic acid was affected by the conditions, but the major products are formed in each case and give a constant chromatographic profile under a given set of conditions. Later products appeared to derive by further reactions. The rate of the reaction is increased by increasing pH (164 x 10^{-5} h^{-1} at pH 4.0 and 6020 x 10^{-5} h^{-1} at pH 8.0; both at 35 C) and temp. (pH 8.0:5 C, 764 x 10^{-5} h^{-1} ; 35 C, 6020 x 10^{-5} h^{-1} . pH 5.0: 5 C, 50 x 10^{-5} h^{-1} ; 35 C, 825 x 10^{-5} h^{-1}). The Arrhenius activation energy is 49.0 plus or minus 6.5 kJ mol^{-1} at pH 8.0 for caffeic acid oxidation. The intensity of brown produced at 35 C in 168 h was highest at pH 6, followed by pH 7 and then pH 8. Brown (420-nm) generation correlated well (P less than or equal to 0.001) with caffeic acid consumption at all pH's and temp. Some of the oxidation products were formed at equal max concn. independent of the pH but at rates that were highest at high pH. Others were dependent on pH, and the highest concn. and rates were found at high pH. The controlling factor in the rate of autoxidation is indicated to be phenolate anion concn. AS

252 Jolly (DA), Schutz (HG), Diaz-knanf (KV) and Johal (J). Organic foods. Consumers attitudes and use. Food Technology 43(11); 1989; 60, 62, 64, 66

253 Pokorny (J), Pilkova (L), Davidek (J) and Valentova (H). Effect of Amadori rearrangement products on the non-enzymic browning in model systems. Nahrung 32(8); 1988; 767-776

The AMADORI products was prepared from D-glucose and L-alanine after HASHIBA. The browning process was investigated by determining the absorbance at 520nm, in aqueous solutions at 110 C for 5-8 h. Because of the limited access of oxygen and its low solubility in the reaction medium, the browning proceeded after zeroth order kinetics with the max. browning rate at pH = 8-9. The browning rate remained unaffected by addition of sodium sulphite, rutin, propyl gallate (except when present at high levels), iron (III) chloride or copper (II) chloride but decreased in presence of L-cysteine or iron (II) chloride. Hydrogen peroxide bleached the pigment but did not inhibit the subsequent browning of reaction products. Under experimental conditions the solution of AMADORI product did not darken with substantially greater rate than the solution of D-glucose and L-alanine. Lower additions of D-glucose to the solution of AMADORI product moderately increased the reaction rate while additions of L-alanine or L-hydroxyproline moderately decreased the browning rate. AS

254 Sundar Rao (K), Jones (GP), Rivett (DE) and Tucker (DJ). Fatty acid and amino acid compositions of Brachychtion discolor, Brachychtion diversifolius, and Brachychiton acerifolius seeds. Journal of Agricultural and Food Chemistry 37(4); 1989; 916-917

For the first time the fatty acid and amino acid comp. of B. diversifolius, B. discolor and B. acerifolius seeds have been reported in this paper. The seeds were indigenous food eaten by Australian aborgines. The chemical comp. revealed 29.3, 32.1 and 30.5% resp. in B. discolor, B. diversifolius and B. acerifloius seeds. Linoleic and oleic acids were the predominant fatty acids in the triacylglycerols and cyclopropene fatty acids malvalic acid and sterolic acids were present in small concn. (4.6-5.6%, 0.7-1.1%) whereas the protein contents were 26.9, 38.1 and 35.0% resp. The proteins contained most of the essential amino acids except sulphur containing amino acids. NGKR

255 Wedzicha (BL), Goddard (S) and Garner (DN). Enzymic browning of sulphocatechol. International Journal of Food Science and Technology 22(6); 1987; 653-657

When sulphur dioxide inhibits the enzymic browning of catechol catalysed by mushroom tyrosinase, the main reaction product is 4-sulphocatechol. When assessed for its browning potential, this product appears to be unreactive and does not inhibit the enzyme. AS

256 Wedzicha (BL) and Kaputo (MR). Reaction of melanoidins with sulphur dioxide. Stoichiometry of the reaction. International Journal of Food Science and Technology 22(6); 1987; 643-651

Sulphur dioxide, in the form of sulphur (IV) oxoanions (S(IV)), e.g. HSO_3 , sulphur dioxide , reacts irreversible with non-enzymic browning model melanoidins (M_r > 12000, prepared by combination of 1.25 mol glucose with 1 mol. glycine ((pH 5.5, 90 C, 22 h)). When the reaction with S(IV) is carried out for > 39 days at 40 C and pH 5.5 with initial concn. of melanoidin of 5.71 g/l and S(IV) of 0.0371 M (equivalent to C. 2400 p.p.m. sulphur dioxide), up to one sulphur atom is incorporated for every two mol. of glucose used to form the polymer. This stoichiometry is discussed in relation to the degree of unsaturation of the melanoidin. AS

Chemistry(Analytical)

257 Brunn (H), Georgii (S), Stojanowic (V), Flemmig (R) and Thalacker (R). Xenobiotics in foodstuffs-estimation of a daily food intake. I. Determination of polychlorinated biphenyls in selected foodstuffs. Deutsche Lebensmittel-Rundschau 85(8); 1989; 239-246

The concn. of six selected single PCB congeners, for which legal tolerance levels became valid in 1988 and of the congener No. 49 (2,2', 4,5'-tetrachlorobiphenyl) were determined in foodstuffs of animal origin, in margarine and beer, which are important for the alimentary acceptance of polychlorinated biphenyls. The investigations show that the tolerance levels were only reached up to a max. of 20% with exception of sheep cheese (imports) and mutton (inland). The major polychlorinated biphenyls found in the samples were the high chlorinated PCB congeners Nos. 101, 138, 153 and 180. Low chlorinated biphenyls as 2,2', 4,5' - and 2,2', 5,5'-tetrachlorobiphenyl (PCB Nos. 49 and 52) were also found in many of the analyzed samples in the lower concn., though are must mention that PCB No. 49 (2,2,4,5'-tetrachlorobiphenyl) was the main contributor. If only the easily metabolized congeners No. 28(2,4,4'-trichlororbiphenyl) and No. 52 are determined, then a non-existence of low chlorinated biphenyls in foodstuffs would falsely stated. For all PCB congeners we investigated in the foodstuffs of animal origin, margarine and beer, we estimated an average daily intake with help of model calculations. The average daily intake of 3.4 µg PCB (sum of the determined congeners) per day and person, or 0.05 µg per kg body wt., so the model calculations showed the following results. The main sources of the PCB intake were the fatty foodstuffs sausage, butter, margarine and fishes followed by milk, eggs and cheese. Meat, poultry and venison contributed only little, beer nothing to the average daily intake of polychlorinated biphenyls. AS

258 Denis Page (B) and Avon (RJ). Determination of methyl bromide in foods by head space capillary gas chromatography with electron capture detection. Journal of the Association of Official Analytical Chemists 72(5); 1989; 815-822

259 Mitchell (GE). Review of methods for the detection of irradiated foods. Food Technology in New Zealand 23(5); 1988; 28-30

This paper reviews some of the potential methods for identification of irradiated foodstuffs. Aspects covered include requirements for a detection method, changes produced in food by irradiation, electrophoretic patterns and gel chromatography of proteins, measurement of free radicals, spectrophotometry, chemiluminescence and thermoluminescence, measurement of conductivity, formation of specific chemicals, formation of radiolytic hydrocarbons, formation of deoxy-compounds, measurement of carbonyl compounds, effect on enzymic activity and microbiology. 18 references. SRA

260 Schatzki (TF) and Wong (RY). Detection of submilligram inclusions of heavy metals in processed foods. Food Technology 43(11); 1989; 72-76

This article describes the use of photographic X-ray radiography and scanning electron microscopy (SEM) to identify particular contaminants in frozen TV dinners, illustrating a method for screening processed foods. Covers X-ray radiography, microscopy and elemental analysis, chemical structure, evolution of results. 19 references. SRA

261 Ulbricht (G). Model ideas for utility value determination of foods. Ernahrungsforschung 34(3); 1989; 81-83 (De).

An approach to the utility value detn. of foods is presented which gives the model for quantitative registration and observation of the development of utility value within the nutrio-economic reproduction process. Five components of the utility value (nutritional value, sensory value, freshness, time economy in food preparation popularity) were used as base data and then assembled to a synthetic utility value index. Among the different mathematical terms the most practice oriented synthetic characteristic results from the combination of additive and multiplicative coupling of base data. AS

FOOD MICROBIOLOGY AND HYGIENE

Enzymes

262 Koide (K) and Karel (M). Encapsulation and stimulated release of enzymes using lecithin vesicles. International Journal of Food Science and Technology 22(6); 1987; 707-723

Ethyl alcohol

263 Gibbons (WR). Batch and continuous solid-phase fermentation of Jerusalem artichoke tubers. Journal of Fermentation Technology '(Hokko Kogaku Zasshi') 67(4); 1989; 258-265

Two strains of Kluyveromyces marxianus were evaluated for their ability to ferment Jerusalem artichoke tuber pulp to ethanol under pH levels ranging from 2.0-6.3. Bacterial contamination was prevented in batch, solid-phase fermentation when pulp was initially adjusted to pH 3.5 or less, and maximal yeast populations occurred at pH 3.0-3.5. Fermentation times were also shortest for both yeast (13-18 h) and ethanol (48-64 h) production when pulp pH was in this range. However, ethanol yields (41-53% of theoretical) and fermentation efficiencies (68-78%) were somewhat lower than expected, with only 6.6-7.2% (v/v) ethanol produced by strain Y-1598 and 5.7-6.9% produced by strain Y-1550. Based on these parameters, the continuous solid-phase fermentor was operated for 396 h using strain Y-1598. The pH of pulp entering the fermentor was adjusted to 2.5 to compensate for partial neutralization by the mild steel of the fermentor. This resulted in fermenting pulp with a pH of 3.0-3.5, and therefore no contamination. Pulp exiting the fermentor after 72 h contained 6.9 x 10^8 yeast cells/ml and 7.3% ethanol, which represented 55.9% of the theoretical yield and a fermentation efficiency of 73.3%. Further modifications (partial and hydrolysis, finer grinding, etc.) should permit higher yields. AS

Fermented foods

Vinegars

264 Troncoso Gonzalez (AM) and Guzman Chozas (M). Metallic contaminants in Andalusian vinegars. Nahrung 32(8); 1988; 743-748

A study on the content of several metallic ions and arsenic in Andalusian vinegars has been carried out. The technique employed was atomic absorption spectrophotometry. The measurements were performed directly in the samples. The detn. of these ions is interesting since they can produce in certain amounts undesirable organoleptic effects or even make an attempt on the health (toxic elements). No kind of relevant contamination was found. AS

Microorganisms

265 Haas (GJ), Prescott (HEJr), Dudley (E), Dik (R), Hintlian (C) and Keane (L). Inactivation of microorganisms by carbon dioxide under pressure. Journal of Food Safety 9(4); 1989; 253-265

Carbon dioxide under pressure killed bacteria, molds and yeasts. The effect was synergistic with raised temp. and acidic pH and anatagonized by lowered water activity. KMA

Bacteria

266 Patchett (RA), Kelly (AF) and Kroll (RG). Rapid detection of bacteria by an amperometric electrode system - a comparison of some redox mediators. Food Microbiology 6(3); 1989; 159-169

The rate of reduction of various mediators and mediator cocktails by E. coli, together with reoxidation currents at an amperometric electrode were examined. When used singly at their optimum concn., thionine, ferricyanide and 1,4-benzoquinone gave similar rates of current increase [21.0-25.6 pA min^{-1} (10^{5} cfu)$^{-1}$] The presence of 1,4-benzoquinone enchanced the rate of reduction of low concn. (1mM) of ferricyanide but decreased the reduction rate at high concn. (28 mM) of ferricyanide. Applications of this mediator cocktail to the detection of pure cultures of E. coli allowed the detection of approx. 10^{6} cfu mL^{-1}. However, the amperometric signal was increased to approx. 42 pA min^{-1}(10^{5} cfu)$^{-1}$ However, when the method was applied to meat samples, bacteria were not detected due to the high level of background current. AS

Bacillus cereus

267 Kamat (AS), Nerkar (DP) and Nair (PM). Bacillus cereus in some Indian foods, incidence and antibiotic heat and radiation resistance. Journal of Food Safety 10(1); 1989; 31-41

Market samples of pulses, rice and rice products, oils, fish, meat specific milk products and ice creams were examined for the incidence of Bacillus cereus. This organism was found in 28.5% of rice and rice products (100% of boiled rice), 40% of fish, 80% of chicken and meat products, 30% of spices and 87% of ice creams. Pasteurized milk and milk products and protein rice food powder containing milk or cocoa were also contaminated with B. cereus. These isolates were resistant to 50 µg/ml ampicillin but were susceptible to kanamycin (10 µg/ml) streptomycin (25 ug/ml), chloramphenicol (30 µg/ml) and tetracycline (10 µg/ml). KMA

Listeria

268 Beumer (RR) and Brinkman (E). Detection of Listeria spp. with a monoclonal antibody based enzyme linked immunosorbent assay (ELISA). Food Microbiology 6(3); 1989; 171-177

A monoclonal antibody-based ELISA method for the detection of Listeria spp. was evaluated for its ability to detect this organism in artifically contaminated food products. When the enrichment broth contained 10^6 cells/ml or more, independent of their physiological state, positive ELISA reactions was obtained. Some influence of product and/or competitive microorganisms could be detected. However to assure the successful application of ELISA efficient enrichment procedures are necessary, especially when Listeria spp. are present at low levels. AS

Staphylococcus

269 Gelosa (L). Valuation on the validity of two immunological methods for the staphylococcal enterotoxin determination in foods. Industrie Alimentari 27(262); 1988; 1069 (It).

Two immunological tests, one of reverse passive latex agglutination (RPLA) and the other of enzyme immune essay (ELIA), have been performed for the research of the staphylococcal enterotoxins produced by Staphylococcus aureus strains isolated from suspected foods, and for the direct research of the enterotoxins from food responsible of poisoning. The results reported in this preliminary investigation are rather discordant on the efficacy and efficiency of survey particularly for the reverse passive latex agglutination test. Therefore further researches are needed before the immunological tests are used for sanitary and legal actions in the alimentary field. AS

Fungi

Mushrooms

270 Burton (KS), Frost (CE) and Atkey (PT). Effect of vacuum cooling on mushroom browning. International Journal of Food Science and Technology 22(6); 1987; 599-606

The effects of two cooling methods and two storage temp. on mushroom quality, anatomy and wt. loss were compared. Mushroom quality was assessed as a function of cap browning and hyphal structure. Storage of mushrooms at 5 C conserved quality and reduced wt. loss as compared with those stored at 18 C. No differences in quality or hyphal structure were found between vacuum and conventionally cooled mushrooms when subsequently held at 5 C; when cool storage was followed by a period at 18 C vacuum-cooled mushrooms were significantly better with regard to colour (enzymic browning) than those conventionally cooled. The rate of wt. loss during storage at 5 C was greater for vacuum-cooled than conventionally cooled mushrooms. AS

BIOTECHNOLOGY

Nil

TISSUE CULTURE

Nil

FOOD ADDITIVES

Antioxidants

271 Hrissafidis (D), Toth (L) and Messer (St). Production of curing smoke concentrates without water for the examination of their antioxidative activity. FAT Science and Technology 91(5); 1989; 207-210

Smoke concentrate without water has been prepared and its antioxidative capacity has been checked. The conc. based on acetic esters, which absorbs smoke and have better dispersion property than water. It is named as liquid smoke concentrate. N.

Colourants

Bixin

272 Srinivasulu (C) and Mahapatra (SN). A process for the isolation of bixin. Research and Industry, India 34(2); 1989; 137-138

A process for extraction of bixin from Bixa orellana (Annatto) which is being used as a natural colourant for food and dairy products has been described. The process involves extraction with ethyl acetate, desolventization and purification of crude solid by recrystallisation from ethyl acetate. Bixin was obtained as a violet crystal with m.p. 198 C and an yield of 1.15%. KAR

Emulsifiers

273 Riego Martin (mB) and Gomez Herrera (C). Interfacial physical chemistry of food grade emulsifiers. Part II. Mechanisms for emulsion stability. Emulsions in typical processed foods. Crasas Y Aceites 39(2); 1988; 111-118

Flavourings

Vanilla

274 Riley (KA) and Kleyn (DH). Fundamental principles of vanilla/vanilla extract processing and methods of detecting adulteration in vanilla extracts. Food Technology 43(10); 1989; 64, 66, 68, 70, 75, 77

Review with 15 references. SRA

Stabilizers

Guar gums

275 Joginder Singh, Kaushal (GP) and Rajan Sood. A new flavonol glycosi
from guar (Cyamopsis tetragonoloba L. Taub). Journal of the Indi
Chemical Society 66(11); 1989; 833-834

A new flavonol tetraglycoside has been reported from guar, ac
hydrolysis of flavonol glycoside gave myricetin, L-rhamnose and
glucose. The absence of phenolic group at C-3 and C-7 of the flavon
tetraglycoside was also experimentally proved. KAR

Sweeteners

276 Shah (PM). Sweeteners from starch. Indian Food Industry 8(3); 198
13-15

277 Tunaley (A), Thomson (DMH) and McEwan (JA). Determination of equi
sweet concentrations of nine sweeteners using a relative rating tech
nique. International Journal of Food Science and Technology 22(6)
1987; 627-635

The sweetness intensity of a 5% sucrose standard was compare
with that of selected concn. of aqueous solutions of sucrose, fruc
tose, glucose, sorbitol, lactitol, aspartame, saccharin, acesulfame
and a mixed extract of the leaves of Stevia rebaudiana Bertoni. Dif
ferences in sweetness were rated using a 150 mm continuous line scale
anchored at the extremities with Much less sweet' and Much mor
sweet' and at the mid point with `Standard'. Analysis of variance wa
used to examine the effects of assessors, sessions, replicates, sam
ples and interactions. Regression lines were fitted and equi-swee
concn. determined for each sweetener. Although the results indicate
that it is more appropriate to consider an equi-sweet range for eac
sweetener, practical considerations necessitated the use of a singl
consensus concn. Variation in the data was sweetener dependent; th
more complex the total perception associated with a sweetener, th
more variable the results. AS

Aspartame

278 Balasubramanyam (BV). Aspartame. The New artifical sweetener. India
Dairyman 41(11); 1989; 576-577

A brief general article covering method of aspartame preparatio
from phenylalanine and aspartic acid; extent of use of aspartame as
table-top sweetener in India for the diabetics and stability of aspar-
tame. KAR

279 Van der Ven (AA). Aspartame. Properties and applications. Industri
Alimentari 28(267); 1989; 34-38 (It).

Describes aspartame properties, application and stability. BV

CEREALS

280 Aguerre (RJ), Gabitto (JF) and Chirife (J). Shape factors for the analysis of diffusion in air drying of grains. International Journal of Food Science and Technology 22(6); 1987; 701-705

The shape factors of different var. of wheat, corn (maize), rice, sorghum, sunflower seeds and soybean have been experimentally determined. Shape factor values ranged from 0.63 to 0.99. These values are useful for correcting literature moisture diffusion coeff. in grains of different shapes, obtained from the analysis of drying curves; this allows direct comparison of diffusivity in different grains. AS

Barley

Barley flour

281 Allison (MJ). Areas of absorption relating to malt extract values in modified near infrared spectra of barley flour. Journal of the Institute of Brewing 95(4); 1989; 283-286

Twentynine barley cvs were micromalted and the milling energy, nitrogen, acid soluble beta glucan and malt extract were determined. The whole meal of the unmalted samples were scanned over a near infrared spectrum and the scanned data was correlated with malt analysis data of the samples, to predict the malting quality of barley with special emphesis on malt extract. Predicted malt extract values resulting from an NIR multiple regression equation with principle component analysis terms correlated well (r = 0.934) with the normal extract values. The NIR spectrum was restructured according to weighting modified by the regression coeff. in the PC regression equation for hot water extract values and the restructured spectrum showed a number of absorption peaks & troughs. The strong peak at 2100 nm was correlated to positively to malt extract. Troughs at 2180 nm, 1980 nm and 1700 nm indicated a negative relationship between malt extract and protein. The wide troughs at 1830 and 2330 nm negatively correlated with malt extract and beta-glucan. NGM

Oats

Oat bran

282 Oakenfull (D). Oat bran. Does oat bran lower plasma cholesterol/and, if so, how?. CSIRO Food Research Quarterly 48(2); 1988; 37-39

Evidence from animal and human studies have shown that oat bran can effectively lower plasma cholesterol concn. There is a marked contrast to wheat bran and dietary fibre in general, which seem to have little or no effect on plasma cholesterol concn. Oat bran is a highly variable material. Different types of oat bran and oat products are likely to be highly variable in their effectiveness. SRA

Rice

283 Ajayi (OA) and Agun (AB). Effects of degree of parboiling on some quality parameters of rice. Journal of Food Science and Technology, India 26(5); 1989; 245-247

This investigation was carried out to study the changes in quality of processed rice due to parboiling. Samples of "OS6" var. of paddy was used for the exp. by cleaning the paddy before processing. The parameters studied are grain breakage swelling capacity and water absorption ratio. The steeping temp. was between 55 and 75 C while steaming period was from 60 to 120 min. at atm. pressure. It was seen for a 16 h steeped paddy an acceptable parboiled product resulted at 65-75 C soaking temp. and steaming periods between 90 and 110 min. The higher the soaking temp. the lower the breakage swelling capacity and water absorption ratio. With a longer steaming period the breakage decreased and also lowered the swelling capacity and water absorption ratio. NGKR

284 Bhaskar (G), Srivastav (PP) and Das (H). Effect of phosphate and citrate on quick-cooking of rice. Journal of Food Science and Technology, India 26(5); 1989; 286-287

The effect of phosphate and citrate on quick-cooking of rice viz. pankaj', var. was studied. This process involved rinsing of the rice in sodium bicarbonate followed by cooking in disodium phosphate and calcium citrate solution and finally drying in a cabinet dryer. The results showed that the treated rice cooked faster (3.7 times for raw rice and 1.2 times for parboiled rice) than the untreated rice. This was due to the loosening of the protein structure of raw rice and thus resulting in increase of water absorption. It was also found that the swelling, colour and appearance were slightly superior to those obtained from cooking untreated rice. NGKR

285 Owusu-Ansah (YJ). Polyphenoloxidase in wild rice (Zizania palustris). Journal of Agricultural and Food Chemistry 37(4); 1989; 901-904

In this study the presence of polyphenolase activity in wild rice (Zizania palustris) and its characterisation have been confirmed. It has been found by partial purification with acetone precipitation and dialysis of the crude extract. It yielded a 2.8 fold purification of the activity of the extract. The optimum pH and temp. of the enzyme were found to be 7.8 and 25 C resp. and this enzyme was found to catalyze the oxidation of O-diphenols but not monophenols. NGKR

Rye

286 Rybka (K), Boros (D), Raczynska-Bojanowska (K), Rakowska (M), Sawicka-Zukowska (R) and Jedrychowska (B). Viscosity of rye grain components. Nahrung 32(8); 1988; 795-800

The viscosity of the water extract of rye grain correlates negatively with the protein digestibility in rats (r = -0.82). The extraction of pentosans and polyuronids from rye grain during at 25 C is paralleled by the increase in viscosity of the extracts; upon longer extraction the viscosity of the extracts is rapidly reduced despite still increasing the amount of extractable polysaccharides. The depolymerization of polysaccharides by the endogenous enzymes of rye grain or the microbial enzymes added results in a decrease of viscosity and increase of the body mass gain of chickens. AS

Wheat

87 Hagstrum (DW). Infestation by Cryptolestes ferrugineus (Coleopter: Cucujidae) of newly harvested wheat stored on three Kansas farms. Journal of Economic Entomology 82(2); 1989; 655-659

The vertical distributions of Cryptolestes ferrugineus (Stephens) in newly harvested wheat, Triticum aestivum L., on three Kansas farms during the first two months of storage were studied to characterize the process of infestation. In three bins, the number of adult C. ferrugineus tended to decrease from top to bottom layers of grain. In the fourth bin, the numbers decreased from top and bottom layers to middle layers. A regression model explained 82.2% of the variation between bins. These data suggest that most of the insect infestation occurred after the wheat was loaded into the bin instead of before or during loading and that insects then dispersed from the grain surfaces into the grain mass. AS

88 Nema (R), Sharma (YK), Bargale (M) and Raiput (LP). Physico-chemical and rheological characteristics of some wheat varieties grown in Madhya Pradesh. Indian Journal of Nutrition and Dietetics 26(2); 1989; 41-47

As the desirable features of finished products of wheat flour are related to the rheological and physico-chemical properties of the dough, these parameters were studied in six wheat var. grown in an Experimental Farm, Jabalpur, Madhya Pradesh, (India). The bran was removed by passing through a rice polisher which was ground in a traditional flour mill and sieved together fine flour (maida). Proximate analysis viz. moisture, protein, fat, total carbohydrates, alcoholic acidity, free fatty acids and gluten, sedimentation value, maltose value, damaged starch diastatic activity, colour grade of flour were estimated. The chemical comp. of wheat flour (maida) prepared through traditional milling compared well with reported values except for high ash content which is undesirable for breadmaking. Of all the var. only one var. (C-306) was observed to be superior in proximate comp., physico-chemical and rheological properties than other var. NGKR

89 Singh (DS), Sah (PC) and Singh (BPN). Milling characteristics of wheat straw. Journal of Food Science and Technology, India 26(5); 1989; 242-244

The present study deals with the performance size reduction system in respect of power consumption profile and the time needed to get five ground product in batch grinding of wheat straw in a lab. hammer mill. Commercial grade broken wheat straw of unknown var. was used for this study and independent variables selected were particle size, grinding time, moisture content and clearance between the hammer blades. The dependent variables were power consumed or no load power consumed or load and wt. of the mass fractions retained on different sieves. The results showed that in batch grinding the interrelation among the size reduction of wheat straw power consumption characteristics and time needed to get five ground product the power requirement of the mill in grinding successively decreased with time and tend to stabilize at the end of grinding period. The plot of cumulative mass fraction with size showed that the ground product had almost a similar distribution trend in all cases. NGKR

Wheat bran

290 Nakadai (T) and Nasuno (S). Enzyme preparation from extract of wheat bran koji by alcohol precipitation. Journal of Fermentation Technology '(Hokko Kogaku Zasshi') 67(4); 1989; 253-257

A method for the preparation method of enzymes for Shoyu making was studied. When enzyme proteins were extracted with water from a column of wheat bran koji culture of Aspergillus oryzae 460, the tailing phenomenon resulted in low recovery. However, a better yield was obtained by the use of the solution passsed at the latter stage of extraction as the extraction liquid for the succeeding extraction. Thus, in case of leucine aminopeptidase (Lew-Gly-Gly as substrate) the extraction yield reached 89%. Considering the extraction yield and the amount of alcohol required to precipitate enzyme proteins, an appropriate volume of extract was found to be 1.5 to 2 times the amount of wheat bran koji. Moreover, less sporulation of koji culture due to a shortening of the culture time to 48 h by the use of germinated spores as seed culture, resulted in less water repellence and a higher yield of extraction of enzymes than in the old culture (58.5 h). The temp. of the mixture of extract and alcohol should be kept at 5 C to increase the yield of leucine aminopeptidase and acid carboxypeptidase. By the concn. of enzyme proteins through ultrafiltration, the use of alcohol could be reduced, and an enzyme preparation with high specific activity and recovery could be obtained. AS

MILLETS

Corn

291 Hardwick (JE) and Glatz (CE). Enzymatic hydrolysis of corn gluten meal. Journal of Agricultural and Food Chemistry 37(4); 1989; 1188-1192

Corn gluten meal was hydrolyzed with Alcalase 2, 4L, an alkaline protease. The effects of enzyme concn. and gluten size reduction on the hydrolysis were studied. Extent of reaction was expressed in terms of both the degree of hydrolysis (using the pH-stat technique) and the concn. of soluble protein. Linear and product inhibition kinetic models were compared to the experimental results after parameter estimation by minimizing the residual sum of squares. The models describe the time-dependent behaviour of three protein/peptide pools-insoluble protein, TCA-insoluble proteins, and TCA-soluble peptides. A simplified product inhibition model gave the best fit to the experimental data. AS

292 Onigbinde (AO) and Akinyele (IO). Effect of water activity on the heat-induced deterioration in the protein digestibility of corn (Zea mays) and cowpeas (Vigna unguiculata). Food Chemistry 33(3); 1989; 215-224

Flour of corn (Zea mays) adjusted to 0.35, 0.56 and 0.75 water activity and flour of cowpea (Vigna unguiculata) adjusted to 0.33, 0.55 and 0.75 water activity, were, resp. stored at 80, 100, 120 C for 6 h. Analysis of the samples at 1 h intervals showed that the protein digestibility (PD) increased to a max. during the first 60 min. followed by progressive decreased with time. The PD was more affected by temp. and time, than water activity (P = 0.01). Both the activation energy (EA) and temp. coeff. (Q_{10}) tend to increase with increased water activity. The EA (KJ/mol) ranged from 14.2 to 19.7 and 18.8 to 29.1, while the Q_{10} ranged from 1.14 tO 1.20 and 1.19 to 1.32 for corn and cowpea, resp. The net percentage decrease in PD and the long half lives (27-133 h) showed that 6 h was too short for first order kinetics to be confirmed. The max. decrease of 9.3% PD in cowpea and 11.5% PD in corn (0.33 water activity; 120 C) could be of nutritional significance. AS

Corn flakes

293 Midden (TM). Twin screw extrusion of corn flakes. Cereal Foods World 34(11); 1989; 941-943

This feature article discusses the advantages of corn flakes production by twin screw extrusion as compared to traditional method. The author reported 11% saving in the processing cost when extrusion method was used because of lower cost of raw materials energy and labour. PHR

Sorghum

294 Pretorius (HE) and du Plessis (LM). Determination of total grain surface waxes using the Iatroscan-Chromarod technique. FAT Science and Technology 91(5); 1989; 200-203

The Iatroscan-Chromarod system was used for qualitative and quantitative detn. of the total surface waxes of sorghum grain. Grain pearling efficiency was evaluated by comparing the polar compounds extracted with hot benzene at different stages of pearling. Extracted waxes were used as a natural standard to compile a calibration curve for quantitative detn. A quadratic equation $y= a + bx + cx^2$ was fitted to the areas of standard solutions ranging from 2 to 20 µg/ul. Results were in close agreement with gravimetric determinations and literature values. AS

Sorghum flakes

295 Al-Kahtani (HA). Processing of different wheat flour-supplemented sorghum flakes (sorghum and wheat of Saudi Arabia). Sensory, nutritional, and microbiological evaluation. Food Chemistry 33(2); 1989; 133-149

Sorghum-based flakes were produced alone and with 10 and 50% blends of different wheat flour (75% extraction rate). Sensory, chemical, nutritional, and microbiological evaluation of the flakes were investigated. Panellists (n = 20) rated the sensory characteristics and found to significant difference in overall acceptability between sorghum- and wheat-supplemented sorghum flakes. Wheat supplementation increased protein and total sugar contents but decreased fat, ash, and crude fibre. Mineral comp. of the flakes generally showed an abundance in Na, K, Mg, P and Fe but shortages in Ca and Cu. However, the 50% wheat replacement resulted in higher Fe but lower P and Zn contents. The 50% blend increased lysine, histidine, arginine, proline, and glutamic acid but decreased leucine and alanine. In general, Saudi No. 4 wheat flour-supplemented flakes had the best amino acid profile. Chemical scores for all samples were higher than those of most similar commercial breakfast cereals. However, lysine and methionine cystine were still the limiting amino acids. Total microbial counts, moulds and yeast counts, total coliforms, and spore-formers were very low or absent in all flakes. AS

PULSES

296 Kurien (PP) and Patil (BS). A hand-operated small-scale pulse dehusking machine for rural use. Research and Industry, India 34(3); 1989; 213-216

A simple hand operated pulse dehusking machine has been described useful for small scale processors. It consists of an emery coated metal cone fixed to vertical shaft rotating inside a conical wire mesh screen. The unit is operated by a handle and bevel arrangement. Arrangement is made to raise or lower the cone. A dust cover with a hopper at top envelops the screen. Another hopper collects the mill stream which come out through a chute. The husk of bold grains like Bengal gram and red gram are initially lossened by soaking in water and sun-drying. Winnowing and sieving separates the dhal (Cotyledons) from the husk. The yield of dhal is 75-80% from Bengal gram and red gram. KAR

Peas

297 Collins (MA) and Buick (RK). Effect of temperature on the spoilage of stored peas by Rhodotorula glutinis. Food Microbiology 6(3); 1989; 135-141

The population of the psychrotrophic pink yeast Rhodotorula glutinis FMT157 increased in numbers on blanched, surface sterilised peas stored at temp. in the range -18 to 15 C. The duration of lag phase and rate of growth were directly related to incubation temp. Yea growth was limited by the total quantity of carbohydrate available the peas. Flavour changes determined by the analysis of headspa volatiles showed that although alcohols and ethanol were isolated fr both inoculated and uninoculated pea samples, considerably more hex nal was detected in yeast inoculated samples earlier in the incubati period, indicating a higher level of lipid oxidation due to lipoxyg nase activity. Thus it would appear that yeast derived enzymes we compensating for loss of similar pea derived enzymes destroyed by t blanching process prior to freezing. In addition 2-methyl furan w formed in yeast inoculated peas at temp. < 5 C leading to a mo objectionable flavour change than in inoculated peas incubated higher temp. Thus control of the yeast contamination of peas and st rage at temp. < 18 C appear to be necessary to ensure a commercial acceptable shelf-life for frozen peas. AS

OILSEEDS AND NUTS

Arecanuts

298 Prakash (TN), Lalith Achoth, Mallikarjunaiah (KG). Processing and mar keting of arecanut in Karnataka. An economic analysis. Indian Coco Arecanut & Spices Journal 12(4); 1989; 109-112

Cost of processing Saraku and Chali type of arecanuts, by smal and large farmers in Shimoga district of Karnataka State (India) wa surveyed by personal interview. Cost calculation was done based c the investment on building, equipment, labour and interest on estab lishment. The cost of processing Saraku calculated comes to Rs 503.96 for large farms and Rs. 616.63 for small farms whereas fc Chali it works out to Rs. 377.60 and 280.55 for large and small farms resp. KAR

299 Raisuddin and Misra (JK). Effect of preservatives and fungicides i arresting fungal infestation over marketed betel nut (Areca catech L.). Journal of Food Safety 10(1); 1989; 1-9

Different treatments were given to control the fungal infest ation in betal nut. A temp. of 60 C for 6 h completely inhibite fungi. Fungal growth was completely suppressed by 5% boric acid ar 1% propionic acid treatment. Dithane M-45 was quite effective a 0.2%. KMA

Brazil nuts

300 Secor (CL) and Lisk (DJ). Variation in the selenium content of indivi dual brazil nuts. Journal of Food Safety 9(4); 1989; 279-281

The average concn. of Se in Brazil nuts was 14.66 p.p.m. Th variation in Se content in nuts was attributed to soil content of Se KMA

Groundnuts

301 Arthur (F). Pests of stored peanuts. Toxicity and persistence of chlorpyrifosmethyl. Journal of Economic Entomology 82(2); 1989; 660-664

Virginia type peanuts were treated with 5, 10, 20 and 30 p.p.m. chlorpyrifosmethyl and infested with fifth-instar almond moth, Cadra cautella (Walker), and Indianmeal moth, Plodia interpunctella (Hubner) at T_1, T_{60}, T_{120}, T_{180}, and T_{270} (days after application). Rates of 5 and 10 p.p.m. did not kill almond moth larve at T_1 and rates of 20 and 30 p.p.m. were only marginally effective. Indianmeal moth larvae were more susceptible to chlorpyrifosmethyl than were almond moth larvae, but only the 20 and 30 p.p.m. rates gave control at T_1. Adult red flour bettles. Tribolium castaneum (Herbst) and merchant grain beetles, Oryzaephilus mercator (Fauvel), were also tested at T_1, T_{60}, T_{120}, T_{180}, and T_{270}. Rates of 20 and 30 p.p.m. were effective against both beetle sp. for at least 180 d after application. AS

Pecans

02 Paster (N), Gagel (S) and Menosherov (M). Pecan quality after harvesting and moulding of different varieties stored at high relative humidity. International Journal of Food Science and Technology 22(6); 1987; 677-681

Pecan nuts stored in their husks may be subjected to rapid mould deterioration. A study was designed to determine quality characteristics of pecan stored for 7 days before shelling. In addition, the moisture absorption of dry pecans and the increase in mould population of three var. (Delmas, Moneymaker and Choctaw) stored under controlled conditions of 26 plus or minus 1 C and 85% RH were investigated. When pecan nuts with husks were stored for 7 days in metal bins soon after harvesting, temp. inside the bulk rose from 24 to 33 C. However, no notable increase in free fatty acids or in peroxide value of the nut meals was recorded. The moisture content of pecan meat influenced fungal infestation: e.g. the moisture content of var. Money maker increased rapidly during storage and the final fungal count on this var. was relatively higher than other var. The increase in both parameters in Delmas was slower and a smaller fungal population was recorded at the end of the trial. AS

Rapeseeds

03 Fiebig (HJ), Sendfeld (A), Jorden (M) and Aitzetmuller (K). Investigation on the determination of total glucosinolate content in rapeseed. FAT Science and Technology 91(7); 1989; 266-271 (De).

A new, quick and sensitive chromatographic method for detn. of total glucosinolate in rapeseed is described. Glucosinolate is hydrolysed by enzyme myrosinase into glucose, sulphate ion and isothiocyanates and sulphate ion is estimated by ion-chromatography. N

304 Kroll (J), Kujawa (M) and Baumgrass (R). The influence of mechanolytic procedures on the content of antinutritive compounds in rapeseed. Nahrung 32(8); 1988; 801-802

As already described the mechanolysis is an useful method for improvement of functional properties of protein preparation caused by changes of structures, splitting of covalent bindings and by combining of mechanolytical and chemical modification. In connection with an aimed decomposition of antinutritive compounds of rapeseeds (first of all of glucosinolates) the mechanolysis is not used as far as we know. For a decrease of destruction resp. of toxic compounds of rapeseeds numerous treatments (processes) have been described including the treatment of seeds or meals with heavy metals. The disadvantages of this metal treatment methods is the relatively high amount of needed heavy metals (about 1% or more). In the case of Cu + this concn. could cause toxic effects in animals after feeding. It is found, that a mechanolytical treatment of rapeseed meal in presence of comparatively small content of heavy metal ions is a way to reduce the content of VOT and progoitrin of these preparations. Further more the mechanolysis leads to inactivation of myrosinase. AS

Sesame

305 Amin (D) and Kothari (IL). Seed composition of some new varieties of sesame. Journal of the Oil Technologists" Association of India 21(1); 1989; 15-16

Fourteen new sesame seed var. evolved at main Oilseeds Research Station, Gujarat Agricultural University, Junagadh, have been analysed. The seed characteristics varied as follows; oil, 33.18-42.34%, moisture, 3.41-5.13%, protein 24-28%. Oil characteristics were: iodine value, 97.08-107.25%, saponification value 187.93-218.79; peroxide value, 19.76-19.83; acid value, 3.92-7.29; oleic acid, 39.08-48.72%; linoleic acid, 35.37-44.56%; palmitic acid, 9.09-15.59%; stearic acid, 3.80-6.0%. Among the var. highest oil content (42.34%) was found in A-6.5 var. There was not much variation in their moisture and protein contents of different var. KAR

Soybeans

306 Smita Nilegaonkar, Vaishali Agte. Induced variation in chemical composition of black seeded soybean variety-Kalitur. Journal of Food Science and Technology, India 26(5); 1989; 256-258

In this paper studies were made for seed protein fractions by electrophoresis and solubility, assay for trypsin inhibitor and nutritive value by proximate analysis to understand the biochemical changes and nutritional performance of the mutants. "Kalitur", a black seeded soybean var. was exposed to physical and chemical mutagens and subsequently studied for changes in electrophoretic and solubility behaviour of proteins, trypsin inhibitor activity and proximate analysis. It was seen that mutation induced changes in protein structure and lowered the fat percentage. In addition a mutant var. "Macs 107" was found to be better than "Kalitur" in having trypsin inhibitor activity lower by 15%. NGKR

307 Subba Rau (BH) and Prasannappa (G). Studies on the physico-chemical parameters of expanded soybean. Journal of Food Science and Technology, India 26(5); 1989; 252-255

The available information on the soybean processing was utilised by using expanded soybean dhal in snack foods. It was seen that longitudinal expansion was over by 50% of its length whereas the increase in width and thickness was marginal. The bulk density reduced by 60% and the overall expansion was in the order of 30-40%. The recovery of the dhal was 68-70% of the raw seeds and most of the trypsin inhibitors were destroyed during processing. The quality of the soybean dhal was comparable to that of groundnut kernel in respect to hardness. NGKR

Soy products

Soy beverages

308 Hung (TV), Kyle (WSA) and Yu (RST). Rapid estimation of protein in soy beverage by infrared spectroscopy. ASEAN Food Journal 4(2); 1988; 65-66

Soybean flour

309 Sahay (KM) and Kachru (RP). Development and evaluation of an extruder for soy flour products. Indian Journal of Agricultural Sciences 59(7); 1989; 478-481

This is a modified version of the earlier developed screw type extruder. In this cooker instead of the screw rotating, a piston and cylinder mechanism is provided, where it presses the material which moves through the die. The specifications worked out are given and the preparation of flour blends is described and the power requirement of extrusion with different flour blends has been worked out. The cost of the equipment is Rs. 3200. Sensory evaluation by a taste panel indicated that the products were well liked and a blend of 40% sago flour gave good and improved taste, colour and texture; blend of 20% soy flour with 40% each of rice and sago flour also gave good product. KAR

Sunflowers

310 Durante (M), Bernardi (R), Lupi (MC) and Sabelli (P). Characterization of Helianthus annuus L. storage proteins. Journal of Agricultural and Food Chemistry 37(4); 1989; 852-855

A new rapid method for the extraction of sunflower seed (Helianthus annuus L.) globulins has been proposed in which the proteins can be extracted from a little portion of each seed without contamination of albumins and chlorogenic acid. In this paper the results on characterisation of globulins extracted by this technique have been compared with results reported by other authors. The variations in polypeptide subunits are examined by electrophoretic analyses of globulins extracted from seed of selfed lines. It has been seen that the native protein shows an apparent mol. wt. of 300 k but alternatively a 190 k band is present in some selfed lines of sunflower. The evidence was found for four major components with mol. wt. 39.2, 32.5, 25.6, and 23.2 k each containing two polypeptides and some minor polypeptides. In the 190 K protein the 32.9 component was absent. NGKR

TUBERS AND VEGETABLES

311 Adhikari (J), Adhikari (S) and Achaya (KT). Glucosinolates in the seeds of Indian Brassicas and Eruca sativa. Journal of the Oil Technologists" Association of India 21(1); 1989; 13-14

The proportions of various alkyl thiocyanates have been determined, and the quantities of the corresponding glucosinolates calculated, in seeds of cv. of Indian brassicas, which include the subspecies rai (Brassica juncea), sarson (Br. compestris var. sarson) both brown and yellow types and toria (Br. campestris var. tori), and in the related jamba (Eruca sativa). In all these seeds, butenyl isothiocyanate, corresponding to the glucosinolate gluconapin, constitutes the main component, accompained by distinctive proportions of other glucosinolates. The quantities of the glucosinolates sinigrin, gluconapin, glucobrassicanapin and others; corresponding resp. to propenyl (allyl), butenyl, pentenyl and other isothiocyanate expressed as % dry basis of seed, were: rai (3 cv.) 0.34-0.38, 3.1-3.6, 0.02-0.03, 0.02-0.04, brown sarson (5 cv.) Nil-0.05 (with one abnormal figure of 0.24), 2.86-4.16, Trace, and Nil-Trace (with one figure of 0.12), yellow sarson (2 cv.) 0.02, 3.3-3.5, 0.02, nil, torie (4 cv.) nil - 0.03, 4.1-5.3, 0.01-0.03 and 0.09-0.18, and jamba (one cv. only) 0.05, 2.8, 0.15 and 0.01 resp. Considering the distinctive taste and flavour of each alkyl thiocyanate, the use of mixed seeds in traditional crushing finds justification. KAR

Onions

312 Tomasicchio (M), Andreotti (R) and Palmieri (B). Study of the lactic acid fermentation of onions. Industria Conserve 64(1); 1989; 28-31 (It).

The effect of some parameters (peeling, salt content of brine, temp.) on the lactic-acid fermentation of onions was investigated. To this end, peeled and unpeeled onions were fermented at three different temp. (18, 25 and 30 C) in brines with 10 and 12% salt content. Results showed that unpeeled onions gave a well-fermented higher-quality products. The lowest temp. used did not allow complete fermentation to be reached (pH greater than or equal to 4.5). At the two other temp. fermentation took place more freely in the 100% brine. AS

Cassava

313 Ukhun (ME) and Nkwocha (FO). The hydrocyanic acid (HCN) content of garri flour made from cassava (Manihot spp.) and the influence of length of fermentation and location of source. Food Chemistry 33(2); 1989; 107-113

White and yellow garri flour-products derived from cassava (Manihot spp.) roots-collected from fifteen locations in Nigeria, were analysed for their HCN contents using the alkaline titration method of the Association of Official Analytical Chemists (AOAC) (1970) and the alkaline picrate method of Willams & Edwards (1980). Garri flour was also produced from meashed cassava roots which had been subjected to fermentation for time periods of between 0 and 72 h, and HCN levels monitored by the two indicated methods. HCN levels were influenced significantly by the source of the flour, the type of flour (whether white or yellow), the method of detn. and the length of fermentation of the greated cassava mash. It is suggested that these factors should be taken into consideration in the evaluation of the products for toxicity. AS

Tubers

Potatoes

314 Bolzoni (L) and Bandini (M). Propham and chloropham residues in potatoes. Industria Conserve 64(1); 1989; 38-41 (It).

An analytical method for determining propham and chlorpropham residues in potatoes is described. The residues are extracted with dichloromethane and cleaned-up by chromatography on a Florisil Sep-Pak cartridge before quantitative detn. This is carried out by gas chromatography with two detection system, viz. the thermoionic nitrogen-phosphorus detector and mass spectrometry. The sensitivity of the method is 0.01 p.p.m. for both pesticides. AS

315 Kumar (R) and Mukherjee (D). Sprouting and free amino acid changes in potato tubers with pre-harvest maleic hydrazide treatment. Indian Journal of Horticulture 46(1); 1989; 66-72

Standing crop of potato was sprayed with 0, 750, 1000 and 1500 p.p.m. of maleic hydrazide (MH) 40 days before harvest to control sprouting in post harvest crop. Soon after harvest these potatoes were placed at room temp. (31 plus or minus 2 C) for 3 days followed by storing in cold storage for 105 and 194 days. Various concn. of preharvest MH treatments could not inhibit sprout initiation but were very effective in checking the sprout length. MH reduced the sprout wt. of tubers, but did not prevent rottage. The treated tubers had higher free pool of amino acids compared to the control. Thirty day storage caused a significant increase in the total free amino acids of untreated and treated tubers. KAR

Potato flour

316 Nanda (P) and Khanna (P). Nutritive value and shelf-life of home based potato flour. Indian Journal of Nutrition and Dietetics 25(9); 1988; 288-291

Household method for potato flour preparation, its nutritive value, shelf-life and sensory quality of its recipes prepared for weaning infants and children are reported. Consumption of 100 g of potato flour provides nutrients between 2.8 and 4.5 times than that provided by an equal quantity of raw tuber. Replacement of potato flour wholly or partially in place of cereals in preparing the recipes did not show any adverse effect on appearance, colour, taste or texture. Potato flour has a shelf-life of 21 days and hence is recommended to be used as a subsidiary food in place of cereals in a few recipes. NGKR

Yams

Yam chips

317 Adeyanju (SA) and Ikotun (T). Microorganisms associated with mouldiness of dried yam chips and their prevention. Nahrung 32(8); 1988; 777-781

The broad objective of this study was to isolate and identify the microorganisms causing mouldiness of stored yam chips and to look for ways of preventing the problem. Microorganisms isolated included Aspergillus flavus, A. glucus, A. nidulans, A. niger, A. ochraceous, A. tamarii, A. candidus, Penicillium oxalicum, Trichoderma longibrachyatum, Rhizopus nigricans, Cylindrocarpon radicicola, Neurospora crassa, Botryodiplodia theobromae, Bacillus subtilis, Bacillus cereus, Erwinia carotovora and Serratia marcescens. Some of these microorganisms are transient invaders. Of the calcium-based chemicals used to prevent mouldiness, only calcium carbonate and calcium hydroxide proved effective and also prevented infestation of the chips by storage pests throughout the period of study. Whereas the product of the untreated yam chips was preferred in terms of colour, the product of calcium carbonate and calcium hydroxide treated yam chips were preferred in terms of taste and texture. As for physiological reaction after eating the products of the treated chips, calcium hydroxide treated chips seemed to be more preferred by the members of the tasting panel. AS

Vegetables

318 Bautista (OK), Kosiyachinda (S), Rahman (ASA) and Soenoeadji). Traditional vegetables of ASEAN. ASEAN Food Journal 4(2); 1988; 47-58

319 Daniel (M). Polyphenols of some Indian vegetables. Current Science 58(23); 1989; 1332-1334

16 leafy and fruit vegetables were examined for the presence of 14 polyphenols. Leaves of all the leafy vegetables examined contained

various flavonoids. Flavonols were found in all the vegetables contained quercetin and/or kaempferol and their various methoxylated derivatives. The 6/8 -hydroxylated flavonols gossypetin and quercetagetin were found in Moringa leaves. In cabbage and Hibiscus sabdariffa flavonols were present in traces. The leaves of Colocasia contained flavones (apigenin and luteolin) instead of flavonols. None of the plants screened contained glycoflavones. Proanthocyanidins were seen in the leaves of Moringa while anthocyanins were located in H. sabdariffa and Impomea aquatica. KAR

320 Pizzocaro (F), Gasparoli (A), Boschetti (T), Ricci (R) and Zanetti (L). New aspects of heat inactivation in vegetables before freezing. Note II. Enzymatic activity and fatty acid composition in frozen vegetables. Industrie Alimentari 28(270); 1989; 392-397, 402

The stability of the fatty acid comp. during frozen storage at -20 C has been studied on raw and blanched (varying degrees) samples of french bean, squash and Asparagus, in relation to peroxidase and lipoxygenase activities. The peroxidase activity (soluble form), initially present in non-treated vegetables, can be expressed by the ratios 0.28 : 1.0 : 0.06 (French bean : squash : asparagus); the lipoxygenase activity 1 : 0.01 : 0.58. Dyring frozen storage (9 months) the soluble peroxidase considerably decreases in the non treated vegetables, whereas the ionically bound peroxidase (determined in the squash only) is more cryoresistant. In its turn the lipoxygenase activity decreases more in the french bean and in the squash than in asparagus. The residual enzymatic activity in blanched samples lend to decrease as well. However temp. phenomena of regeneration have occurred occassionally. The linoleic and linolenic acids decrease in the raw vegetables after 9 months of 10.8 and 21.8% (french bean), of 0.0 and of 7.4% (squash), of 11.2 and 31.3% (asparagus) resp. In the inactivated vegetables these decrements are not remarkable if the heat treatment is enough to inactivate totally the lipoxygenase activity. Since the linolenic acid (diunsatured), the decrements noticed may be considered as the results of the oxidation catalyzed by the lipoxygenase and by the non-enzymatic lipid oxidizing activity. AS

Brussels sprouts

321 Springett (MB) and Adams (JB). Properties of Brussels sprouts thioglucosidase. Food Chemistry 33(3); 1989; 173-186

Some important properties of Brussels sprouts thioglucosidase have been studied using ammonium sulphate precipitates. The enzyme activity followed Michaelis-Menten kinetics with sinigrin as substrate. Ascorbic acid was shown both to activate and to inhibit the thioglucosidase with an optimum activity at 10 M ascorbate. Two pH optima were observed at pH 6-6.5 and pH 8, possibly indicating the presence of different isoenzymes. Thioglucosidase was completely inhibited on freezing in aqueous conditions at -6 and -12 C but was active at these temp. in 35 % (w/w) glycerol. A temp. optimum activity at about 50 C was found and, at higher temp. (60-90 C), the enzyme was thermally inactivated by a complex mechanism. Using extracts from different regions of Brussels sprouts, it was found that the majority of the thioglucosidase activity was in the outer leaves. AS

Cucumbers

322 Kanwar (JR) and Sharma (PR). Studies on the chemical and elemental analysis of cucurbit kernels and their seed coats. Indian Journal of Nutrition and Dietetics 26(2); 1989; 34-40

Seeds of cucumber (Cucumis sativus) and bottle gourd (Lagenaria vulgaris) procured from the vegetable seed farms of Punjab Agricultural Univ. Ludhiana, India, were analysed for moisture, ash, ether extracts, crude fibre and N, non-reducing and total sugars. The ether extract of the kernel was 44.4 to 46. 3%. The seed coats were very poor in fat and protein but high in crude fibre. The kernels were rich in minerals specially P, K, Mg, Fe, S, Cu, Mn and Zn. The ether extract of the kernels of sp. varied between 44.4 and 46.3%. The crude protein content of kernels varied between 30.7 and 31.3%. As these are potential sources of oil and protein need has been stressed to extensively grown, collect and utilize their seeds for oil and protein production in order to save valuable foreign exchange and alleviate their acute shortage. NGKR

Melons

323 Ezeike (GOI). Hygroscopic characteristics of unshelled egusi (Melon) seeds. International Journal of Food Science and Technology 23(5); 1989; 511-519

Desorption characteristics of unshelled egusi seeds was determined to improve drying and reduce storage losses in shell before processing. A simple procedure was developed using the Clausius-Clapeyron equation for calculating the isosteric heat of sorption, which was found to decrease with increase in moisture content of the crop. SRA

Pumpkins

324 Teotia (MS), Ramakrishna (P), Berry (SK) and Kaur (S). Some engineering properties of pumpkin (Cucurbita moschata) seeds. Journal of Food Engineering 9(2); 1989; 153-162

To explore the possibility of developing a similar or alternative mechanical dehulling process, the engineering properties of pumpkin seeds, kernels and hulls were studied. The results showed that it is possible to dehull the seeds mechanically by a system in which the sharp tips of the seeds impinge on a hard surface. It is also possible to separate kernels, hulls and any unhulled seeds in suitable equipment using the differences in their properties such as surface roughness, densities and transport velocities. SRA

Tomatoes

325 Floros (JD) and Chinnan (MS). Determining the diffusivity of sodium hydroxide through tomato and capsicum skins. Journal of Food Engineering 9(2); 1989; 129-141

An experimental method to measure the effective diffusivity of chemical substances through the skin (exocarp) of fruits and vegetables is described. A circular disk of skin was placed in a specially constructed diffusion cell to separate two flowing solutions. Changes in concn. with time were monitored and the diffusion properties were estimated from Fick's diffusion equation. The calculations were based on results taken either in the early transient period or in the late period of steady-state flow. The method and the design of the diffusion cell allowed measurements with negligible edge effects and rapid detection of errors due to leaks or contamination. diffusion characteristics were determined for the penetration and movement of sodium hydroxide through the skins of tomatoes and pimiento peppers. The diffusivity through tomato skin was 2.0×10^{-8} cm^{2} s^{-1} and through pimiento pepper skin 5.5×10^{-8} cm^{2} s^{-1} at 72 C. Results were reproducible and agreed with previous studies. AS

326 Jimenez (L), Ferrer (JL) and Paniego (LM). Rheology, composition and sensory properties of pulped tomatoes. Journal of Food Engineering 9(2); 1989; 119-128

The rheological behaviour of batch-sterilized and flow-sterilized (HTST) pulped tomatoes was measured with the aid of a rotary viscometer and compared with that of fresh pulped tomatoes. These products are pseudoplastic and thixotropic, and have a definite yield stress. The yield stress, consistency coeff. and pseudoplasticity decrease in the order: fresh, HTST-sterilized rheological model based on the destruction of the product structure reveals that the structure's destruction rate increases in the order: fresh, batch-sterilized and HTST-sterilized product. The batch-sterilized product has a smaller content of pectins, insoluble solids and, especially, vitamin C. However, the sugar and soluble-solids contents and the pH are similar for all three products. The sensory tests carried out indicate significant differences (5% level) in colour, aroma, flavour and texture, between all three products. The fresh product is clearly preferable to the batch-sterilized product. AS

327 Pirone (G), Mannino (S) and Vicini (E). Heat resistance of Bacillus coagulans spores in strained tomatoes. Industria Conserve 64(1); 1989; 18-20 (It).

Heat resistance of Bacillus coagulans spores in strained tomatoes was determined at temp. of 88, 90, 93, 96 and 98 C and pH values ranging from 4.2 to 4.5. Tryptone soy agar was used as the medium for recovering surviving spores. Within the temp. range 90-98 C, decimal reduction times decreased with decreasing pH. Extrapolation to 100 C gave D_{100} values of 2.57, 2.88, 3.01 and 3.09 min. at pH 4.2, 4.3, 4.4 and 4.5 resp. At 88 C, for all pH values heat inactivation curves were non-logarithmic, so that D values could not be obtained. AS

328 Tong (CBS) and Gross (KC). Ripening characteristics of a tomato mutant, dark green. Journal of the American Society for Horticultural Science 114(4); 1989; 635-638

Respiration, ethylene production, firmness, polygalacturonase activity, cell-wall comp. and soluble uronide content were measured during ripening of two tomato genotypes i.e. `Manapal' and `dark green' (DG). The data suggest that firmness differences between DG and `Manapal' fruit are not due to differing activities of polygalacturonase or changes in cell wall comp. during ripening but to other factors that may affect solubilization of cell wall uronides. BAP

Tomato products

329 Vicini (E), Mannino (S) and Pirone (G). Ability of a Bacillus coagulans strain isolated from a flat sour outbreak to grow in tomato products of various concentration. Industria Conserve 64(1); 1989; 13-17 (It).

Spores of a Bacillus coagulans strain isolated from a flat-sour outbreak of mixed tuna-tomato sauce packed in laminated cartons were tested for capacity of germination and outgrowth in strained tomatoes. Small jars of strained tomatoes adjusted to pH values of 4.1, 4.2, 4.3, 4.4 and 4.5 were inoculated with 10^2, 10^3 and 10^4 /ml spore levels, air or vacuum sealed and incubated at 30, 37, 42 and 55 C. Min. pH for growth was found to be 4.2, under both anaerobic and vacuum conditions; at this pH growth occurred in 7 to 14 days as a function of temp. and inoculum size. The growth of the strain was accompained by a decrease in pH and vacuum. AS

Tomato ketchup

330 Porretta (S), Sandei (L) and Leoni (C). Commercial quality classification of tomato ketchup. Industria Conserve 64(1); 1989; 21-27 (It).

A detailed study of the chemical comp. of ketchup was undertaken. In particular, in order to obtain a useful tool for determining min formulation requirements for this products, a number of samples taken from the Italian market were analyzed for soluble and total solids, ash, K, Ca, NaCl, electrical conductivity, pH, titrable acidity, citric acid, DL-lactic acid, sugars (fructose, glucose and sucrose) consistency (Bostwich and Blotter test), lycopene, 5-hydroxy-2-methyl-furfural, tomato ketchup colour score, water-soluble colour of the liquid portion, water activity. Moreover, by using statistical discriminant analysis a quality-classification method was developed which is connected with some chemical parameters rather than with sensory evaluation, particularly difficult for ketchup because of its comp. The analysis yielded a significant function wich allowed about 86% of the samples to be correctly classified. The discriminant function is as follows: $Y = 0.398a_L + 0.382\ b_L + 0.365$ citric. ac.-0.393 titr. acidity. AS

FRUITS

331 Melvin Couey (H). Heat treatment for control of post-harvest diseas and insect pests of fruits. HortScience 24(2); 1989; 198-202

Certain regulatory restrictions on the use of certain chemic fumigants and pesticides in the recent yrs making the free use a availability of these chemical difficult to presence. Therefore hea treatment techniques have been reviewed so as to check insect pes during post-harvest operations. In this review article details heat-treatments using vapour-heat and hot water banana, papaya man plant are presented. BAF

Apples

332 Blankenship (SM) and Sisler (EC). 2, 5-norbornadiene retards app softening. HortScience 24(2); 1989; 313-314

2,5-NBD, a compound which competes with ethylene for bind sites and inhibits ethylene action in plant tissues, was applied 'Delicious' apples (Malus domestica Borkh.) as a gas in either closed or flowing system. Apples held in the closed system for days at 25 C in either 2000 or 4000 ul 2.5-NBD/liter were as firm fruit held equally long at 5 C; apples held in air at 25 C were l softer. Softening appeared to be mediated by ethylene. Solu solids content and starch loss were similar for fruit held in air in 2,5-NBD at 25 C. The fruit's internal ethylene concn. showed t 500 or 2500 u 2,5-NBD/liter suppressed, but did not completely in bit, autocatalytic ethylene production. The preserving effect 2,5-NBD diminished after 50 days at 25 C. Chemical names us Bicyclo [2-2-1]-hepta-2,5-diene (2,5-norbornadiene; 2,5-NBD). AS

333 Geeson (JD), Smith (SM), Everson (HP), Genge (PM) and Browne (KM). sponses of CA-stored Bramley's seedling and Cox's orange pippin app to modified atmosphere retail packaging. International Journal of F Science and Technology 22(6); 1987; 659-668

The responses of Bramley's and Cox's apples to modified (MA) retail packaging were studied in samples of fruit removed f controlled-atm. (CA) storage at monthly intervals through the keting season, packed in MA or perforated control packs and held un simulated marketing conditions at 15 C. The degree of modificat of the pack atm. and the effects of MA packaging on fruit riper changes were influenced by the duration and conditions of sto prior to packing. In addition, differential effects of MA packag on the extent of retardation of flesh softening and skin yello were found as the storage period was extended. During 2 or 4 wks 15 C, however, MA packs made from low density polyethylene (LDPE, µ) were effective in retarding changes in firmness and skin colou Bramelys, previously stored for < 22 wks (October-March) in 8% ca dioxide + 13% oxygen or for < 30 wks (October-May) in 6% carbon d ide + 3% oxygen. Similarly, during a 2-wk marketing period at 15

LDPE or ethylenevinylacetate (EVA, 30 u) MA packs were effective in retarding some ripening changes in Cox's previously stored for < 31 wks (October-May) in < 1% carbon dioxide + 1.25% oxygen. The practical benefits of MA retail packaging for the marketing of apples are also discussed. AB

34 Knee (M) and Smith (SM). Variation in quality of apple fruits stored after harvest on different dates. Journal of Horticultural Science 64(4); 1989; 413-419

The variation in eating quality of 'Cox' apples after harvest at weekly intervals and storage in 2% oxygen was investigated. The sugar and malate content and flesh firmness of the fruit showed larger variations between seasons and between orchards than between harvest dates; much of the variation between harvest dates was lost during storage. The concn. of butanol and butyl acetate after storage increased with later harvest dates but changes in other volatile compounds were small or inconsistent. Sugar, malate and firmness after storage were correlated with the same attributes of the fruit at harvest. Most of the correlations between one attribute and another could be accounted for as a common correlation with harvest date. A taste panel compared stored fruit from various harvest dates with fruit from a single reference harvest. Consistent discriminations were made in one or more sensory attributes for fruit harvested one wk before or after the reference date. In all except one series there were continuous trends of declining acidity and increasing sweetness. Apples usually were judged less firm or tough with later harvests. The taste panel reported an increase in acceptability with harvest date in all series, although the change was sometimes slow. AB

35 Quaglia (GB), Lombard (M), Menesatti (P) and Bertone (A). Evaluation of some chemical physical characteristics of a new freeze-dried product composed of apple and milk. Industrie Alimentari 27(262); 1988; 1093-1097 (It).

36 Thakur (NS) and Lal (BB). Evaluation of plastic carton and corrugated fibre board carton vis-a-vis conventional wooden box for packaging and transportation of apple. Journal of Food Science and Technology, India 26(5); 1989; 239-241

In this investigation the evaluation studies on the suitability of plastic carton and corrugated fibre board carton for packaging and transportation of apples as compared to conventional wooden boxes are carried out and results presented. Medium size red delicious apple fruits (70 mm plus or minus) 2.5 dia. from the university orchard located in Solan Dist., Himachal Pradesh were harvested at proper maturity and brought to packing house where they were stored, graded and packed in the four types of packages like telescopic corrugated fibre board carton with trays (A1), telescopic corrugated plastic carton with trays (A2), universal CFB kullu pack (A3) and conventional wooden box (A4) of various inner dimensions. These were transported by truck from Nanni to Delhi market covering about 400 KM distance. The results showed that no damage was observed in the body of apple packed in 3 ply telescopic plastic carton and wooden box, whereas in tray packed corrugated fibreboard carton some side rubbing and in CFB kulln pack pressing of corners were noticed. It was seen that the quality of fruit retained during transportation in tray packed plastic carton and tray packed CFB carton was statistically at part through superior to the CFB kulln pack and conventional wooden box. NGKR

Bananas

337 Mallikarjuna Rao (N). Cysteine protease inhibitors from banana (Musa paradisiaca). Current Science 58(23); 1989; 1320-1322

Inhibitors of cysteine proteases were found in ripened and unripened banana (Musa paradisiaca). Extract from unripened banana inhibited the proteolytic activities of papain, ficin and bromelain. Extract from ripened banana inhibited the proteolytic activities of papain and ficin only. Both ripened and unripened banana extracts inhibited oaseinolytic and amidolytic activities of papain. The inhibitory activity of ripened banana extract was stable from extreme acidic pH to neutral pH and unstable at extreme alkaline pH. The inhibitory activity of ripened and unripened banana extracts was stable after heating to 100 C for 10 min. AS

Banana puree

338 Richter (ER) and Vore (LA). Antimicrobial activity of banana puree. Food Microbiology 6(3); 1989; 179-187

An unidentified substance extracted from concentrated banana puree has been shown to inhibit Clostridium sporogenes and other Gram-positive sporeforming bacteria. Water and methanol extracts of concentrated banana purec produced zones of inhibition when tested by well plate biological assay. Organic acids at concn. normally present in banana puree were found not to be solely responsible for the observed inhibition. The unknown substance demonstrated inhibitory effects at pH values as high as 7.5. Heat stability showed that the compound(s) are stable to normal retort temp. AS

Ber

339 Sandhu (SS), Thind (SS) and Bal (JS). Effect of pre-harvest spray of ethephon on size, quality and ripening of ber (Zizyphus mauritiana Lamk.) cv. Umran. Indian Journal of Horticulture 46(1); 1989; 23-27

The trees of ber (Zizyphus mauritiana Lamk.) containing ber fruits were sprayed with ethephon at 0, 200, 400 and 600 p.p.m. levels on February 29 and March 7, 1984. February spray did not increase the fruit and stone size. Breadth, wt. and vol. of the fruits were increased with ethephon treated in March 9. An increase in TSS with corresponding decrease in acidity with all the concn. of ethephon was observed on both the sprays. Among the different concn. of ethephon sprayed on February and March, 400 p.p.m. increased the total and reducing sugar content of the fruits. Ethephon had no effect on starch content. All the ethephon concn. increased the ascorbic acid content over the control. The ripening of the fruits was advanced by

4 to 5 days with all the concn. of ethephon in February spray and the duration of harvesting period was shortened by about 16 days with 400 p.p.m. of ethephon over the control. Ethephon at 200 and 400 p.p.m. sprayed in March also advanced the ripening of fruits by 3 to 5 days and the duration of harvesting period was shortened by 17 days with 400 p.p.m. over the control. KAR

Cider

340 Goni (I), Torre (M) and Saura-Calixto (F). Determination of dietary fibre in cider wastes. Comparison of methods. Food Chemistry 33(2); 1989; 151-159

Cider wastes are rich in polysaccharides and can be considered a suitable source of dietary fibre (DF). The measurement of DF as non-starch polysaccharides' (48.3% dry matter) and as non-starch polysaccharides plus lignin', (63.3%), is performed by spectrophotometric and AOAC procedures. A good agreement between both method for polysaccharide content is found. Correction for condensed tannins (3.1% dry matter) is made. The Klason lignin residue contains protein and condensed tannins. AS

Grapes

341 Pesis (E) and Frenkel (C). Acetaldehyde vapours influence postharvest quality of table grapes. HortScience 24(2); 1989; 315-317

\`Sultanina' and \`Perlette' grapes (Vitis vinifera L.), with initially low sugar concn. (13% to 14% total soluble solids content; TSS) and high acidity received postharvest application of 0.2% to 0.9% acetaldehyde vapours for 24 h. This treatment increased TSS, decreased acidity of the juice, and enhanced the sensory preference by judges in a test panel. However, the response was limited to early picked fruit with low TSS and high acidity and the treatment damaged the berries of \`Sultanina' grapes and left some off-flavour. The levels of acetaldehyde and ethanol in the juice were positively correlated with the amount of applied accetaldehyde, the level of ethanol being 20 times higher than that of acetaldehyde. After 4 days of shelf life, the levels of both acetaldehyde and ethanol declined in the juice. AS

342 Reddy (BMC) and Prakash (CS). Effect of grinding and ethrel treatments on berry weight, colour and quality of Gulabi grape. Indian Journal of Horticulture 46(1); 1989; 19-22

The effects of girdling the vine trunk in combination with application of 250 p.p.m. ethrel at various stages of cluster development on the ripening and quality of Gulabi var. of grape were studied. Double girdling 250 p.p.m. ethrel application improved the berry quality and reduced the number of green berries in a bunch to 6.04% as against 11.02% in untreated control. It also hastened the maturity of bunches by about 10 days. Girdling alone increased the total soluble solids in the berries but ethrel showed no effect on total soluble solids. Acidity was not affected by girdling or ethrel treatment KAR

343 Shikhamany (SD) and Narayana Reddy (N). Effect of growth retardants on growth, yield and quality in grape cv. Thompson seedless. Indian Journal of Horticulture 46(1); 1989; 31-38

To prevent the excessive vegetative growth and to increase the productivity vines of Thompson seedless var. of grape were sprayed with 2-chloroethyl trimethyl ammonium chloride (CCC) (1000-3000 p.p.m. levels) and maleic hydrazide (MH) (500-1500 p.p.m. levels) at different leaf stages after pruning. Fruit quality was not influenced by any of the treatments. However 3000 p.p.m. of CCC application at 15 leaf stage was highly effective in increasing the fruit yield/vine. KAR

Guavas

344 Pandey (DK), Pathak (RA) and Pathak (RK). Note on the foliar application of nutrients and plant growth regulators in cultivator Sardar guava. II. Effect on ripening of fruits. Indian Journal of Horticulture 46(1); 1989; 28-30

Attempts were made to reduce the ripening period of rainy season guava crop by spraying with urea (2%), potassium sulphate (1%), borax (0.2%) and zinc sulphate (0.4%), either alone or in mutual combination or along with ethrel (250 p.p.m.). First spraying was done before flowering followed by the second and third at fruit setting and 3 wks after fruit setting. Ethrel was applied at the start of the fruit ripening. All treatments advanced ripening; max. earliness in ripening of 10 days was observed with urea + zinc sulphate and the span of ripening period was reduced to a min. of 25 days when this treatment was combined with ethrel. Urea application alone or along with borax advanced ripening by 9 days. KAR

345 Weinert (IAG) and van Wyk (PJ). Guava puree with reduced stone cell content. Preparation and characteristics of concentrates and nectars. International Journal of Food Science and Technology 23(5); 1988; 501-510

A decanter centrifuge was used to decrease the content of stone cells in guava puree before evaporation. Concn. factors between 3.3- and 4.3-fold were achieved. Thirty-seven per cent of the stone cells could be removed in a small decanter, whereas virtually all sclereids are removed on an industrial scale. Small significant increases in moisture contents, total soluble solids and titratable acidity and decreases in pectin fractions and ascorbic acid contents (average 38%) occurred during processing; guava colour became darker, redder and less yellow. the apparent viscosity of then puree decreased after centrifugation and increased again during evaporation. Nectars prepared from puree with reduced stone cell content were the most stable. Concn. of puree reduced cloud stability of nectars by up to 34% after 35 days storage, but homogenization improved the stability. Panel members only found significant differences in the colour of nectars prepared from the three conc. AS

Kiwifruits

346 Dall'Aglio (G), Gola (S), Leite (DMB), Carpi (G) and Previdi (PM). Preparation and stability of under refrigerated conditions of Kiwifruit pulp, juice and nectar. Industria Conserve 64(1); 1989; 32-37 (It).

A pilot plant for processing kiwifruit into pulp and juice in the cold was developed which incorporates a special pulper operating on the halved fruit. Production yields and then physicochemical and microbiological characteristics of the products were determined. Stability tests were conducted on the frozen juice, on the thawed juice during refrigerated storage as well as on a nectar prepared by adding sucrose syrup to the fresh juice and stored in a refrigerated vending machine. AS

347 Roudot (AC). Image analysis of kiwifruit slices. Journal of Food Engineering 9(2); 1989; 97-118

An objective method for evaluating the appearance of kiwifruit slices is proposed. Three groups of 30 fruits each, subjected to different storage conditions for 24 wks, were examined. Kiwifruit slice images under proper illumination were digitised, then extracted from the background and analysed. Some numerical aspects of the samples were tested and their classification possibilities considered. Fine distinctions were evaluated after modification and standardisation of grey level histograms for the samples. Finally, four quantities were selected to quantify the internal structure of kiwifruit. The results show large differences, in both fine and coarse structure, between fruit stored under normal air and those stored under an atm. of 2% oxygen and 5% carbon dioxide. Samples exposed intermittently to high carbon dioxide levels were similar to those stored in normal air. AS

348 Spraggon (SA). Rapid dry matter maturity test for kiwifruit by microwave. CSIRO Food Research Quarterly 48(2); 1988; 33-36

This paper describes the use of a microwave oven for the detn. of dry matter content, as a measure of the maturity of kiwifruit. The detn. takes less than one hr, including the simplified preparation of the sample. SRA

Longans

349 Wara-Aswapati (O), Srikok (D), Gomolmanee (S) and Boon-Long (P). Effect of Benomyl and sulphur dioxide on storage life of fresh longan. ASEAN Food Journal 4(2); 1988; 73-75

Mangoes

350 Hemavathi (J), Prabhakar (JV) and Sen (DP). Drying and storage behaviour of mango (Mangifera indica) seeds and composition of kernel fat. ASEAN Food Journal 4(2); 1989; 59-63

Wide variations were found in the seed content and comp. of kernel fat of eight commercially important var. of mangoes (Mangifera indica). The seed constituted 8.1-22.0% of the fruit, while kernel constituted 45.7-72.8% of the seed on an as-is basis. The fat content in kernels varied from 8.2 -14.3% on a dry wt. basis. The physico-chemical characteristics of the fat were: softening point, 23-34 C; free fatty acids, 1.3-3.5 g oleic/100 g fat; saponification value, 172-206 mg KOH/g fat; iodine value, Wijs 40.1-56.5 and unsaponifiable matter, 1.0-1.8%. The percentage fatty acid of kernel fat varied as follows; Palmitic, 6.4-15.4; stearic, 25.7-45.3; arachidic, 0.6-2.9; oleic, 40.2-53.5; linoleic, 3.6-9.5 and linolenic 0.2-1.8. Storage of fresh wet seeds of Alphonso (51.2% moisture content) for as long as 16 days under ambient conditions (23 -27 C, 60-65% RH) resulted in 25.8% kernel spoilage; the free fatty acids of the kernel fat increased from 1.9 to 4.6 g oleic/100 g fat. The fresh wet seeds could be dried to a safer moisture level of 10.8%, by sun-drying for 6 to 7 days or by mechanical drying for 24 h. AS

351 Singh (BP), Kalra (SK) and Tandon (DK). Effect of size grading on the storage of mangoes. Indian Journal of Horticulture 46(2); 1989; 154-160

`Dashehari' mango was harvested at June end and graded into A, B, C, based on size and wt. A-grade fruits were mostly floaters and C-grade were sinkers while B-grade fruits were in between. After 5 days storage at room temp. ripe fruits were about 38, 57 and 76% in A, B and C- grades, resp. Although, all fruits ripened after 7 days, their marketability declined to 100, 80, 50 in A, B, C- grades, resp. Which has 100% on 5th day in all the grades. Due to the late harvest of fruits, the decay losses were approx. 18, 33 and 36% in A, B and C-grades, resp. after 9 days, but the losses were negligible on 7th day of storage. PLW was lower in A grade fruits. There were not many differences in TSS, acidity or vitamin C but beta-carotene development was much slower in A-grade fruits (2.61 mg/100 g pulp) which may indicate slackened ripening as compared to B and C- grade fruits. Of the three grades, A- grade fruits ripened gradually, had bigger size, better appearance and marketability. AS

352 Thomas (P) and Joshi (MR). Reduction of chilling injury in ripe Alphonso mango fruit in cold storage by temperature conditioning. International Journal of Food Science and Technology 23(5); 1988; 447-455

The influence of ripening temp. and cold conditioning of climatic fruits on the incidence of chilling injury (CI) in ripe mango fruits Alphonso during refrigerated storage was investigated. Mangoes held and ripened at 20 C plus or minus 1 C, RH 85-90% showed little evidence of CI when subsequently stored at 5 or 10 C up to 14 days. The CI in ripe mangoes was also avoided by holding preclimatic fruits for a period of 30 days at 10 C and then ripening them at 27-34 C. The quality of ripe mangoes remained good during cold storage for 7 days and were acceptable until 10-14 days with min changes in texture, flesh colour, carotenoids, soluble solids, titratable acids and ascorbic acid. Shelf-life of ripe mangoes can thus be extended under refrigeration by pre-storage conditioning. SRA

353 Wills (RBH), Yuen (MCC), Sabar , Lakshmi (LDS) and Suyanti . Effect of calcium infiltration on delayed ripening of three mango cultivars in Indonesia. ASEAN Food Journal 4(2); 1988; 67-68

Muskmelons

354 Lester (G). Gamma irradiation, hot water and imazalil treatments on decay organisms and physical quality of stored netted muskmelon fruit. Journal of Food Safety 10(1); 1989; 21-30

Gamma rays (2 kilograys) was ineffective in controlling decay and surface molds. Hot water treatment (57 C) coupled with shrink-film wrap was effective in controlling decay activity. Imazalil (1000 p.p.m.) treatment coupled with shrink-film wrap controlled the incidence and severity of decay for 60 days. KMA

Oranges

355 El-Zeftaw (BM), Peggie (ID) and Minnis (DC). Postharvest treatments, storage temperature and rootstocks in relation to storage disorders and fruit quality of Valenica oranges. Journal of Horticultural Science 64(3); 1989; 373-378

The effect of certain post-harvest ohemical treatments, storage temp. and rootstocks on storage disorder and fruit quality of `Newton Late Valencia' oranges were evaluated. A combination of dip treatments with benomyl 750 p.p.m. GA 500 p.p.m gave highest percentage of sound fruit compared with other combination treatments when stored at 15 C for 18 wks and at 5 C for 9 wks followed by 15 C for 9 wks. Details of combination treatments and storage temp. are presented. BAP

Papayas

356 Kumar (M), Mital (BK) and Garg (SK). Effect of papaya pulp addition on the growth of Lactobacillus acidophilus. Journal of Food Safety 10(1); 1989; 63-73

Effect of papaya pulp addition to skim milk on the growth characteristics of Lactobacillus strains was studied. All the strains exhibited higher viable counts, shorter generation time, increased acid production, greater sugar utilization and fall in pH upon addition of papaya pulp. KMA

357 Schwab (W), Mahr (C) and Schreier (P). Studies on the enzymic hydrolysis of bound aroma components from Carica papaya fruit. Journal of Agricultural and Food Chemistry 37(4); 1989; 1009-1012

In this paper the results obtained after simultaneous enzyme catalysis extraction using two different types of hydrolases, beta-glucosidase (emulsin) and acid phosphatase from papaya fruit (Carica papaya L.) are presented. This has been carried out by HRGC and HRGC MS identifications of bound volatiles from the above fruit after isolation of an extract obtained by amberlite XAD-2 adsorption and methanol elution followed by simultaneous enzyme catalysis extraction using the above enzymes. The results showed aromatic substances such as benzaldehyde benzyl alcohol, 2-phenyl ethanol, and benzyl isothiocyanate as well as (E)-3, 7 - dimethylocta-2, 6-dienoic acid were liberated by glycosidase whereas the monoterpene alcohols linalool and 2,6-dimethyloct-7-ene-2,3,6-triol were released by phosphatase activity. Further compounds identified have been discussed. NGKR

358 Shetty (KK), Klowden (MJ), Jang (EB) and Kochan (WJ). Individual shrink wrapping. A technique for fruit fly disinfestation in tropical fruits. HortScience 24(2); 1989; 317-319

Papayas (Carica papaya L.) that were infested with eggs and first instar larvae of the Oriental fruit fly (Dacus dorsalis Hendel) showed a reduction in the number of insects present when the fruits were subsequently wrapped for at least 96 h with plastic shrink-wrap film. In a related study, individually wrapped mangoes (Mangifera indica L) that were artifically infested with larvae of Drosophila melanogaster no longer harbored living larvae when the wrap remained for 72 h. These studies suggest that further development of individual film wrapping techniques may provide a method for eliminating insect infestation from some edible fruits. AS

359 Zee (FT), Nishina (MS), Chan (HT) and Nishijima (KA). Blossom end defects and fruit fly infestation in papayas following hot water quarantine treatment. HortScience 24(2); 1989; 323-325

Viable larvae of the Oriental fruit fly (Dacus dorsalis Hendel) were found in Carica papaya L. `Kapoho' fruit after hot water double-dip quarantine treatment in Hawaii. Two types of blossom end defects, navel and definite pinhole, were responsible for the failure of the quarantine treatment. These defects resulted from abnormal placental growth near the blossom end of fruit. Defective fruit also had higher incidences of internal infection by Cladosporium sp. and Fusarium spp. A survey conducted in the Puna district of the island of Hawaii showed that the incidence of trees bearing defective fruit ranged from 5.3% to 31%. AS

Pears

360 Kahlon (PS) and Sandhu (RS). Effect of different treatments and date of harvesting on the cold storage life of Patharnakh pear fruits. Journal of Food Science and Technology, India 26(5); 1989; 290-292

Investigations were conducted to see the effect of chemicals and time of harvesting on the storage behaviour of `Patharnakh' pear fruits at Amritsar, Punjab. None of the treatments improved all the characters of fruit quality at any stage. Ethephon 300 p.p.m. and 3000 p.p.m. at stage III and 2000 p.p.m. at stages I and III exhibited higher physiological loss in wt. (PLW) of the fruits over control. While the spoilage losses were minimised with its lower concn. (300 and 400 p.p.m.) ethephon at 400 p.p.m. in stages II and III and its higher concn. (2000 and 3000 p.p.m) gave fruits of good palatability rating. Calcium chloride treated fruits registered less PLW which were more firm at stage I and with 7.5 % at stage III over control but were of poor sensory quality and failed to effect physical characters including the spoilage of fruits. TSS and sugars, however, increased and acidity levels of fruits decreased during storage irrespective of the treatments. Ethephon at 300 p.p.m. at stage I and 400 p.p.m. at stage II and III proved most beneficial for the cold storage of `Patharnakh'. AS

361 Paola Previdi (M), Vicini (E) and Cassani (A). Spoilage of canned vegetables inoculated with Yersinia enterocolitica isolated from cans of peas showing post-process leakage. Industria Conserve 64(1); 1989; 3-7 (It).

The ability of three Yersinia enterocolitica strains (two isolates from swollen cans of peas and the ATCC 9610 strain) to grow and produce gas in four different canned vegetables was studied as a function of incubation temp. Cans of peas, shell beans, string beans and minestrone soup were incubated at six different temp. (7, 18, 25, 30, 37 and 42 C) following inoculation. The three strains were able to grow in 66.67% of the cans and to swell 69.79% of the spoiled cans as a function of temp. and medium. The gas-producing capacity of the isolates was greater than that of the ATCC 9610 strain. The legumes proved to be suitable media for growth (83.33% of spoiled cans), while the minestrone soup was remarkably less suitable, growth with swelling occurring in 16.67% of the cans only at 7 C. AS

Plums

362 Raynal (J) and Moutounet (M). Intervention of phenolic compounds in plum technology. 2. Mechanisms of anthocyanin degradation. Journal of Agricultural and Food Chemistry 37(4); 1989; 1051-1053

In this study the simultaneous monitoring of the various constituents during drying of d'Ente plum fruit (Prunus domestica, var. d'Ente) was carried out by HPLC. It was found that anthocyanins disappear during initial hours of drying. Glutathion was used to show that anthocyanins can be transformed by a coupled oxidation mechanisms involving quinone formation from chlorogenic acid by polyphenoloxidase. NGKR

363 Raynal (J), Moutounet (M) and Souquet (J-M). Intervention of phenolic compounds in plum technology. 1. Changes during drying. Journal of Agricultural and Food Chemistry 37(4); 1989; 1046-1050

In this investigation the main simple phenolic compounds in plum fruit likely to have an effect on its quality were studied by HPLC. The formation of these compounds and the enzyme polyphenoloxidase (PPO) was monitored during the first phase of drying under different temp. The polyphenols were extracted separated and identified by HPLC and the enzyme activity was determined. It was found that the d'Ente plum was characteristic in high neochlorogenic acid content and neochlorogenic acid is 2.4 times as high in the epidermis. Rutin is the predominant flavonol glycosides and is found in the epidermis. The degradation of dihydroxy cinnamic acids is directly connected to the development of PPO activity and its degradation was low at low temp. of drying whereas the flavonoids degradation was high with increasing drying temp. and their reaction to heat treatment was found to be quite different. NGKR

Strawberries

364 Li (C) and Kader (AA). Residual effects of controlled atmospheres on postharvest physiology and quality of strawberries. Journal of the American Society for Horticultural Science 114(4); 1989; 629-634

Results from this research demonstrate the residual effects of controlled atm. (CA) on post-harvest physiology and quality of strawberries. These residual effects may include the reduction of respiration and ethylene production rates, accumulation of ethanol and possibly other volatiles, maintenance of flesh firmness and retardation of flesh colour development. Exposure of strawberries to controlled anhydrophies of varying concn. of carbon dioxide and oxygen and the resulting effects of exposures to such concn. are described in detail. BAP

CONFECTIONERY, STARCH AND SUGAR

Confectionery

Chocolates

365 Pagani (M) and Quadri (G). Filth-tests carried out on high fat level and chocolate produots. Industrie Alimentari 28(270); 1989; 389-391 (It).

Cocoa

366 Schmid (H) and Chiappa (O). Cocoa roasting, from rib to liquer. Industrie Alimentari 28(270); 1989; 378-384 (It).

Sugar

367 Londhe (MB), Jadhav (SY) and Zende (AA). A new approach to measure colour in white sugar manufacture. Indian Sugar 39(9); 1989; 675-681

Development of colour during white sugar manufacture is determined by ICUMSA method. Although the colour removal during juice clarification can be found out by conventional method during pan boiling operation colour development measured by conventional method is not found suitable. A new method based on colour x solid product has been tried in two factories for judging colour removal or colour development operations, which shows that the method is more precise than the conventional method. Authors termed the unit as a tonnes ICUMSA unit. The new method could be used to judge colour development during A massecuite boiling, B massecuite boiling, C massecuite boiling, crystallisation and centrifugal operation. KAR

Jaggery

368 Anon. Evolution in jaggery manufacture. Indian Sugar 39(8); 1989; 611-614

Preparation of jaggery in sugar factories has several advantages including the higher extraction of juice. The experience of Jaknur factory in Karnataka (India) in the preparation of jaggery has been illustrated as an example for this. KAR

Sugarcane juices

369 Beniwal (MS), Satyavir and Taneja (AD). Effect of red rot on juice quality of sugarcane. Indian Sugar 39(6); 1989; 403-406

Sugarcane red rot disease caused by Colletotrichum has great influence on the juice quality. It reduced the brix (7.03-32.94%), pol % (7.43-38.70) and commercial cane sugar (7.84-43.31%), while the reducing sugars increased (19.23-409-452%), depending upon the extent of resistance of the var. to the diseases. In resistant clones like CO. 7314 the adverse effect on juice quality was least, while it was max. in highly susceptible clones like Co. L. 29 and S. 78/560. KAR

370 Sreenivas (K), Mastan Reddy (C), Sreenivasa Reddy (K) and Yallamananda Reddy (T). Influence of nutrient status of leaves on cane yield and juice quality of sugarcane. Indian Sugar 39(9); 1989; 693-697

The study on the influence of nutrient status of leaves on cane yield and quality in three var. of sugarcane (Co 62175, CoT 8201 and Co 7219) showed that the leaf N and sheath K contents were positively correlated with cane yield and negatively with juice sucrose at grand growth and maturity phases. The sheath P content was negatively correlated with cane yield and positively with sucrose at maturity phase. The final sugar yield at harvest was positively correlated with leaf `N' content at formative and grand growth phases and sheath `K' at grand growth and maturity phases. The sheath `P' at maturity was negatively correlated with sugar yield. KAR

BAKERY PRODUCTS

Bread

371 Bera (MB) and Mukherjee (RK). Preparation of rice bran protein concentrate and its use in bread. Indian Journal of Nutrition and Dietetics 26(2); 1989; 48-55

The full fat and defatted rice bran contain about 15 and 20% protein resp. besides containing valuable minerals. This investigation was undertaken to study the protein extraction from rice bran and evaluate its baking quality for use in bread. Kaviraj-Sail var. of raw paddy was milled and bran obtained by giving about 6% polish to the rice, sieved using 20 mesh sieve and bran was defatted by hexane.

Protein conc. were prepared using defatted rice bran. The baking quality was tested by supplementing maida with protein conc. from rice bran at 5 to 15% levels. The bread prepared from this was evaluated for texture, colour of crumb, colour, and nature of crust, grain, aroma, taste and overall acceptability on a 20 point scale. It was seen that the pH of extraction medium affected the protein conc. yield more than time and temp. of extraction. Protein conc. yield was max (39.61%) at pH 10.5, temp. 60-80 C and 60-120 min. Protein conc. up to 5% could be blended with wheat flour for breadmaking without affecting the baking characteristics. NGKR

372 Hellemann (U), Tuorila (H), Salovaara (H) and Tarkkonen (L). Sensory profiling and multidimensional scaling of selected Finnish rye breads. International Journal of Food Science and Technology 22(6); 1987; 693-700

A vocabulary for the description of the sensory properties of Finnish rye breads was developed as a basis for the design of a practical quality control product development system to be used in a later study. Six samples, selected from thirty-two commercial rye breads, were evaluated for the intensity of twenty-nine attributes and for similarity between sample pairs, Significant differences were found between samples in the intensity of twenty-eight of these descriptors. The data were combined by a multidimensional scaling procedure (KYST 2A and PROFIT), which revealed three discriminative dimensions among the samples: (1) from pleasant rye-like to unpleasant flour-like; (2) from sweet to bitter; and (3) the presence/absence of a characteristic flavour caused by specific baking conditions (low temp., long baking time). The PROFIT procedure identified 20 attributes as important for quality of rye bread samples using multiple correlation coeff. There were five appearance attributes, two odour attributes, six taste attributes, five texture attributes and overall impression of pleasantness and freshness. AS

373 Salovaara (H) and Valjakka (T). The effect of fermentation temperature, flour type, and starter on the properties of sour wheat bread. International Journal of Food Science and Technology 22(6); 1987; 591-597

The effects of the type of wheat flour (white or dark), fermentation temp. (25 C or 30 C) and origin of starter (bakery A compared with bakery B) on acid production and bread properties were examined in a factorial design. The type of flour was the most important factor; with dark flour (ash content 1.64%) the acetic acid concn. in the bread was almost double that from white flour (ash content 0.86%); lactic acid was 30 to 50% higher. Acid production increased as fermentation temp. increased to 30 C, but was not influenced by the origin of the starter. Loaf specific vol. decreased with acid concn., but souring lengthened the mould-free time from 4 days to 5 to 8 days or more as acidity increased. Sour wheat bread had a characteristic taste. Those with higher acidity values were more bitter and pungent. Rye sour and rye sour bread production technology could also be utilized in white breadmaking. AS

Pasta

374 Littmann-Nienstedt (S). Evaluating a ring test to determine lactic acid and 3-hydroxy-butyric acid in pasta and refined pastry made from biscuit dough. Deutsche Lebensmittel-Rundschau 85(6); 1989; 183-184 ((De)).

10 laboratories join in a ring test to investigate into a gas chromatographical working method to determine lactic and 3-hydroxy-butyric acid in eggnudles and biscuit. Statistical evaluation resulted in very favourable values with regard to reproducibility, comparability and finding back of acid quantities. The method is proposed for inclusion in the method collection according to art. 35 of the German Food Law (LMBG), and is published in December 1988. AS

375 Skurray (GR), Young (D) and Nguyen (M). Rice bran as a source of dietary fibre in pasta. ASEAN Food Journal 4(2); 1988; 69-70

MILK AND DAIRY PRODUCTS

376 Barraquio (VL) and van de Voort (FR). Milk and soy proteins. Their status in review. Canadian Institute of Food Science and Technology Journal 21(5); 1988; 477-493

The dairy industry has been competing with the soybean industry for many yrs on two fronts, namely, lipids and proteins. The margarine-butter struggle is essentially over, however, the protein battle is just beginning to develop. The markedly lower price of soy and the research effort which is going into soy protein to make it even more acceptable to formulators should be of the utmost concern to the dairy industry. In this review paper, the manufacture, physico-chemical, functional, and nutritional properties of milk and soybean proteins are summarized and compared. Milk proteins have good nutritional value, functional properties and a wholesome image which make them somewhat more attractive to the food industry over the comparative newcomer, soy protein. Further research based on newer technologies such as extrusion processing and the use of milk protein/soy blends may alleviate some of the cost problems associated with milk proteins and increase the overall consumption and utilization of both proteins. AS

Milk

377 Balasubramanyam (BV) and Puranik (DB). Aspectic packaging of milk. Indian Dairyman 41(12); 1989; 639-642

In India with the introduction of UHT processing of milk aseptic packaging is fast increasing. Some of the commercial systems available like, tetrabrick, combi bloc, Doypack, and bag-in-box are reviewed briefly. KAR

378 Bardhan (PC). Operation flood-Its evolution, the strategy followed and progress achieved. Indian Dairyman 41(12); 1989; 609-623

An exhaustive review of the topic covering such aspects like evolution of operation flood, strategies adopted, development as an institution, application of various technologies, for integrated development, the impact of operation flood system on the milk supply, farmer participation, marketing strategies adopted and its impact on income of farmers and achievement of shelf sufficiency in milk and milk products. KAR

379 Khedkar (CD), Mantri (JM) and Kulkarni (SA). Therapeutic properties of acidophilus milk. Indian Dairyman 41(11); 1989; 562-565

Acidophilous milk which contains Lactobacillus acidophilus is becoming more popular and many qualities have been attributed to this milk. Of the therapeutic properties, the scientific literature published show that it possesses antimicrobial activity, and is useful in treatment of gastrointestinal disorders, in constipation, as anticancer agent and in controlling body cholesterol level. KAR

380 Prasad (C), Prasad (S) and Singh (MD). Physico-chemical changes in evaporated milk during manufacture and storage. Indian Dairyman 41(10); 1989; 505-508, 553

Physical and chemical changes during manufacture and storage of evaporated/concentrated milk lead to problems like change in colour; pH; Viscosity; flavour; fat separation; sedimentation and sensory characteristics. Author reviews various suggestions made by experts to overcome these problems and suggests for the adoption of right type of processing and storage. KAR

381 Sharma (T) and Mathur (BN). Appraisal of thermal processing conditions for pasteurisation of milk. Indian Dairyman 41(12); 1989; 633-637

Out breaks of Listeriosis disease by consuming pasteurised milk has become a great concern regarding the effectiveness of pasteurisation. Authors dwell on the effect of pasteurisation especially at different temp. on pathogenic organisms, keeping quality of milk, processability of pasteurized milk and the effect on organoleptic properties, effect of high pasteurisation temp. on nutritive value and zanthine oxidase; and technology economic feasibility of raising the pasteurisation temp. KAR

382 Singh (RB), Rakesh Babu Mishra (AK). A glance at operation flood phase I, II and III. Indian Dairyman 41(11); 1989; 558-560

Gives an overall view of the Operation Flood Programme which is directed towards the development of dairy industry in India, involving setting up of rural milk producers co-operative organisations to procure, process and market milk. How the Operation Flood I, II and III have contributed for the development of dairy industry in India and for increasing the milk supply have been described. KAR

383 Tikku (D). Innovation in milk distribution. Indian Dairyman 41(12); 1989; 625-630

The author recollects the traditional milk distribution system in India and describes how the seasonal variation in production and consumption, variation in fat content, climate, transportation, and others influence the milk distribution system. The operation system of the Delhi mother dairy has been described as an example for adoption of some innovative system. KAR

384 Yadav (JS), Sunita Grover Batish (VK). Role of marketing and related factors in the microbiological quality of milk and milk products. Indian Dairyman 41(10); 1989; 527-534

Methods of marketing milk and milk products, factors affecting the microbiological quality during marketing, like the effect of mode of packaging and distribution, temp. and time of holding, marketing environment and marketing personnel have been reviewed. The milk products described are fluid milk in small and bulk vending, khoa and khoa based sweets, paneer and chhanna, cream, butter and ghee, conc. and dried milks, frozen dairy products and fermented milk. KAR

385 Yesim Ozbas (Z) and Temiz (A). Comparison of methods for enumeration of Escherichia coli in raw milk samples. Journal of Food Science and Technology, India 26(5); 1989; 248-251

In this study the different methods viz. the most probable number (MPN) method of AOAC modified direct plate method (MDP), violet red bile agar/violet red bile agar (VRBA/VRBA) and modified MPN (MMPN) for the enumeration of Escherichia coli in naturally contaminated raw milk were compared. The statistical analysis of data showed no significant difference among the counts obtained by these methods. NGKR

Milk products

Cheese

386 Champagne (CP) and Goulet (J). Growth of bakers' yeast (Saccharomyces cerevisiae) in lactose hydrolyzed cheese whey ultrafiltrate. Canadian Institute of Food Science and Technology Journal 21(5); 1988; 545-548

A bakers' yeast strain (VVR-215), resistant to catabolite repression, was used for biomass production on lactose-hydrolyzed whey ultrafiltrate. Glucose was initially metabolized, followed by galactose without any lag phase. Ethanol accumulated during growth on glucose even under aerated conditions. Ethanol, which was produced from glucose but not from galactose, was assimilated after depletion of galactose. Utilization of glucose and galactose by yeast cells reduced the potential for product inhibition of beta-galactosidase, and permitted hydrolysis of residual lactose. Supplementation with ammonium sulphate and corn steep liquor increased biomass yields, corn steep liquor being the most effective. AS

387 Esteban (MA) and Marcos (A). Chemical prediction of water activity in processed cheese. Journal of Dairy Research 56(4); 1989; 665-668

By linear regression analysis, a highly significant negative correlation (r = - 0.96) was found between the mean ash concn. values (g/100 g moisture) and water activity of six types of processed cheese (low-fat, semi-fat, extra-fat, double fat and special). The regression equation water activity = 0.9951-0.0032 (ash), applied to 40 cheese samples, yielded water activity values which differed by < 0.005 water activity units from those measured experimentally in 75% of the samples. The max. differences between the calculated and experimented water activity values (found in only two samples) were plus or minus 0.01 water activity units. AS

388 Zuber (F), Megard (D) and Cheftel (JC). Continuous emulsification and gelation of dairy ingredients by HTST extrusion cooking. Production of processed cheeses. International Journal of Food Science and Technology 22(6); 1987; 607-626

Processed cheese was prepared batchwise and by extrusion cooking. The Cheddar based cheese mix contained varying amounts of polyphosphate ions, rework, lipids, water and/or non cheese proteins. The extrusion conditions (barrel temp., screw speed and screw profile) were also varied. The texture, structure and colour characteristics of batch and extrusion-processed cheeses were evaluated using penetrometry, scanning electron microscopy and reflectance measurements. The degree of fat emulsification was assessed and the proportion of casein nitrogen sedimentable by ultracentrifugation was determined, as a means of following micellar disruption plus casein restructuring due to extrusion and to the additional creaming step. Results indicate that extrusion cooking can be used to continuously mix, melt, emulsify and gel the cheese mix constituents, and that processed cheeses or cheese analogues of varying texture (spreadable to sliceable) can be obtained, with a mean residence time in the extruder of about 100 sec. AS

Cheddar cheese

389 Bines (VE), Young (P) and Law (BA). Comparison of Cheddar cheese made with a recombinant calf chymosin and with standard calf rennet. Journal of Dairy Research 56(4); 1989; 657-664

The cheesemaking properties of recombinant chymosin form Kluyveromyces lactis (Gist-Brocades Chymosin 610) were compared with those of standard rennet in parallel trials with the same milk and mixed culture starter. For each pair of cheeses the cheesemaking characteristics, mass balance results, comp. of the cheeses at 6 wks and maturation rates were similar. A taste panel was not able to differentiate between the cheeses at 3, 6 or 12 months. AS

390 Vijayender Rao (D). Manufacture of UF Cheddar cheese-developments and challenges. Indian Dairyman 41(12); 1989; 657-660

Ultrafiltration (UF) offers as a practical method of disposal of whey and increasing the cheese yield at the same time. The process of UF operation, effect of UF on milk constituents, different methods of increasing cheese yield by UF process, and the changes taking place during the manufacture of Cheddar cheese from UF concentrated milk have been reviewed. 18 references. KAR

Dahi

391 Ghandhi (DN) and Muralidhara Rao (S). Dahi and acidophilus milk. Indian Dairyman 41(10); 1989; 521-525

Dahi (Indian fermented milk) and acidophilus milk are compared. Aspects covered include types of dahi and acidophilus milk products produced in India; properties and comp. of dahi and acidophilus milk, possibilities of improving them, therapeutic value, techniques of their preparation and general consumer acceptance of the products. KAR

Ghee

392 Ghatak (PK) and Bandyopadhyay (AK). Chemical and sensory quality of ghee marketed in Calcutta and Kalyani (West Bengal). Indian Dairyman 41(10); 1989; 515-518

47 ghee samples manufactured by organized and unorganized dairies of Calcutta and Kalyani (India) were analysed for moisture, Reichert-Meissel value, Polenske value, free fatty acid, iodine value, peroxide value and butyro-refractometer reading at 40 C. Flavour, colour and texture of ghee from organized dairies were superior to that from unorganised dairies. Moisture and free fatty acid content and peroxide value in ghee from unorganized dairies were much higher than the ghee from organized dairies. Ghee from organised dairies had much higher saponification values than the ghee from unorganized dairies. None of the ghee collected was adulterated with animal body fat. Vanaspathi (hydrogenated fat) was detected in 11 ghee samples produced from unorganized dairies. KAR

Paneer

393 Dharam Pal and Garg (FC). Studies on utilization of sweet cream buttermilk in the manufacture of paneer. Journal of Food Science and Technology, India 26(5); 1989; 259-264

In this paper the effect of additives like sweet cream buttermilk on the quality aspects of paneer has been studied and results presented. Paneer was prepared from Buffalo milk which was standardised to 5.9% fat by adding buttermilk. The quality of this buttermilk extended paneer (BEP) was compared to conventional paneer (CP). It was seen that addition of buttermilk significantly increased the moisture retention capacity of BEP and also increased the yield by about 1% over CP. It was found possible to improve the texture of CP made at 80 C which was dry and hard by mixing buttermilk solids. It was also seen by adopting coagulation temp. of milk at 70 C the recovery of total solids was significantly higher in BEP as compared to CP; the keeping quality of both types of paneer remaining same. Good quality paneer resulted by using low fat milk(5.1%) by mixing about 30% buttermilk to buffalo milk. NGKR

Yoghurts

394 Kneifel (W), Holub (S) and Wirthmann (M). Monitoring of B-complex vitamins in yoghurt during fermentation. International Bottler and Packer 56(4); 1989; 651-656

Eight commercially available yoghurt starter cultures were examined for their ability to synthesize water-soluble vitamins. In order to yield comparable assaying conditions, 12.5% reconstituted whole milk was used for yoghurt production throughout the exp. When applying the traditional method for yoghurt manufacture (short-time incubating at 42 C/3-4 h) with all cultures the following vitamins were enriched during fermentation by more than 20% thiamin (two cultures), pyridoxine (four cultures), folic acid (one culture), and biotin (two cultures). Two starter cultures were selected and used to compare vitamin profiles during the two different methods of fermentation. In contrast to short-time incubation, long-time yoghurt production (30 C/14 16 h) led to a lesser production of folic acid, but to increased concn. of thiamin and of nicotinic acid. AS

Milk proteins

Casein

395 Bhadanla (AG) and Shah (US). Drying of industrial casein-a review. Indian Dairyman 41(11); 1989; 566-569

Casein drying at industrial level is influenced by air temp., air velocity, air humidity, wet casein characteristics, casein particle size and extent of loading of trays. The paper reviews aspects like drying behaviour of casein, methods of casein drying, drying with tray driers, and fluidized bed driers. New approaches to casein drying techniques and energy requirement for drying are the other aspects covered. KAR

396 Gupta (VK). Technology of edible casein. Indian Dairyman 41(12); 1989; 643-650

Surplus milk available in Indian dairy plants, particularly during flush season, can be used for edible casein manufacture. Standards for edible casein manufacturing processes including separation, pasteurisation, casein precipitation, quality of acid, precipitation temp., whey drainage, curd washing, pressing or dewatering, milling and drying, grinding, sieving and bagging are given. Edible casein from buffalo milk and continuous manufacture of edible casein are the other aspects covered. KAR

397 Martine Le Meste and Duckworth (RB). Effect of water content on the mobility of solute molecules and of protein side chains in caseinate preparations. International Journal of Food Science and Technology

23(5); 1989; 457-466

The effect of water content on the mobility of small solute mol. and of casein side chains was studied by electron spin resonance in caseinate/water systems. The immobilization of nitroxide probes of different sizes and properties were followed drying progressive dehydration of concentrated caseinate preparations (3 g water/g dry protein). Above a characteristic min moisture content a linear relationship was observed between the rotational diffusivity and water content. The slope of the straight lines depended upon the size of the probe and upon the nature of the interactions with the protein. Nitroxide labels were covalently bound to caseinate and the changes in the flexibility of the side chains as hydration changed were followed. The results are discussed in relation to the solvent properties of water, and to recent suggestions concerning the significance, for stability, of the glass transition phenomenon in such materials. AS

398 Sienkiewicz (T), Hohamed (SHT) and Lipke (B). Group separation of caseins from cow milk on hydroxy-apatit. Nahrung 32(8); 1988; 749-753 (De).

Ion exchange-chromatography method with the use of hydroxyapatit is considered one of the methods used for the casein fractionation particularly those containing phosphate in its comp. Simplicity of hydroxyapatit preparation and its easily use in casein fractionation in batches are advantages of this method. Sephadex G-25 or Agarose is used to easement the sample passage through the column. By using of hydroxyapatit in batches, alpha$_s$ -casein can easily separated with the use of buffer solution 0.006 M phosphate at pH 6.6 and the elution is carried out by buffer solution containing 0.25 M potassium dihydrogen phosphate, 0.2 M KCl, 4.5 M urea and 0.002 M di-thiotreitol. Before the elution of alpha$_s$ -casein, beta- and x-casein are separated using buffer solutions containing 0.005 M and 0.1 M potassium dihydrogen phosphate in addition to the previously mentioned components. AS

MEAT AND POULTRY

Meat

399 Akgul (A) and Kivanc (M). Growth of Staphylococcus aureus in kofte, a Turkish ground meat product, containing laser Trilobium spice. Journal of Food Safety 10(1); 1989; 11-19

The influence of Laser trilobum spice on the growth of Staphylococcus aureus was examined in a Turkish ground meat product. Spice reduced Staphylococcus aureus count under most conditions. The growth varied with holding temp. spice levels, inoculation and beef samples. KMA

400 Mahajan (P) and Panda (PC). Effect of post exsanguination electrical stimulation on meat quality. A review. Indian Food Industry 8(3);

1989; 1-9

Electrical stimulation of pre-rigor muscle as a means to increase tenderness and accelerate the hot processing is receiving renewed attention these days while exploiting the process commercially. Research carried out on effect of electrical stimulation on rate of postmortem glycolysis, tenderness, carcass quality and palatability attributes of meat have been reviewed in brief, indicating the future thrust needed in the area. AS

401 Mekhael (KG), Bassily (NS), EL-Shafei (MM) and Said (AK). Nutritive value of meat-soy mixture. Nahrung 32(8); 1988; 729-735

The protein value of meat-soy blend was evaluated by utilizing the net protein ratio (NPR), the relative protein value (RPV) and the serum urea content methods. It was compared with that of meat. Casein was used as a reference protein. NPR values indicated that utilization of meat and meat-soy proteins are comparable. The study of amino acid pattern shows that sulphur containing amino acids are limiting to almost the same degree in meat and meat-soy blend. However, the RPV of meat soy bean blend is slightly higher than that of meat. The lowest serum urea content was that of rats fed meat-soy blend. Therefore, the mixing of the meat with soybean did not reduce the nutritive value of meat, on the contrary there is tendency towards improvement. AS

402 Morley (MJ) and Fursey (GAJ). The apparent specific heat and enthalpy of fatty tissue during cooling. International Journal of Food Science and Technology 23(5); 1988; 467-477

As there is a lack of data on solidifying animal fats under thermal conditions akin to those existing during commercial chilling and freezing processes, the apparent specific heats and enthalpies of pork, beef and lamb adipose tissues in the temp. range 40 to - 40 C were determined dynamically during cooling at linear rates by differential scanning calorimetry. The temp. variation of specific heat and overall enthalpy change measured during cooling were found to differ from similar measurements made during subsequent heating. For the cooling rates used (0.312, 0.625 and 1.25 C/min.) the rate of cooling had only a minor effect on specific heat. The freezing of tissue water showed high degrees of supercooling. AS

Beef

403 Bhattacharya (M) and Hanna (MA). Kinetics of drip loss; cooking loss and colour degradation in frozen ground beef during storage. Journal of Food Engineering 9(2); 1989; 83-96

The objective of this study is to determine the kinetics of drip loss, cooking loss and colour degradation as affected by fat content, type of packaging, storage time and storage temp. It is found that the rate of quality degradation of ground beef patties in terms of drip loss, cooking loss and colour followed first-order relationships. The rate constants were affected by both package type and fat content.

The 30% fat patties showed greater drip, cooking losses and colour changes. Patties packaged in polyethylene had greater drip and cooking losses but less colour change. The effect of storage temp. on the rate constants was insignificant. SRA

404 Buroot (D) and Griffin (WJ). Effect of dimensions on the heating times and weight losses of cylindrical beef joints. International Journal of Food Science and Technology 23(5); 1988; 487-494

Experimental tests showed that cooking loss was not affected by the diameter of a lean joint but decreased very slightly with length. A 7 mm layer of fat cover did not affect cooking losses from the lean meat. Cooking wt. loss was not affected by joint diameter but decreased very slightly with length. Heating time to 74 C increased with joint length and asymtotically approached the heating time for an infinately long cylinder. The variation of heating time with joint diameter and length was predicated using mathematical model. SRA

405 Fox (DG), Perry (T), Eckerlin (RH), Appel (LD), Lisk (DJ), ManzellKL) and Kenny (KP). Brewer's grains as a source of selenium in beef cattle rations. Journal of Food Safety 10(1); 1989; 43-47

Barley grown on high Se soils serve as an efficient supplementary source of Se in cattle rations. The Se content in the blood of cattles fed with this barley was 12-15 µg/100 ml as against 0.01 µg/100 ml in control animals. KMA

406 Gigiel (AJ), Collett (P) and James (SJ). Fast and slow beef chilling in a commercial chiller and the effect of operational factors on weight loss. International Journal of Refrigeration 12(6); 1989; 338-349

Slow beef chilling to avoid cold shortening (trial 1) was compared with rapid chilling to achieve a quick turnover and low wt. loss (trial 2) in a commercial chiller designed to operate under either specification. Both specifications achieved their main aims. In trial 1 no part of the loin fell below 10 C within 10 h postmortem. Deep leg temp. were between 14.5 and 21 C at 24 h postmortem compared with 9.5-14.8 C in trial 2. The percentage wt. loss from fully chilled sides was predicted to be 0.84% less in trial 2 than trial 1. Operational factors, such as the time between death and hot wt., were found to have at least as important an effect on wt. loss as the technical specification of the chiller. AS

Mutton

407 Prasad (VSS). Defference in mutton and chevon quality due to the cooking method. Indian Journal of Animal Sciences 59(11); 1989; 1437-1443

The differences between sheep and goat rib roasts (9-12 ribs) and the longissimus dorsi muscle obtained from 8-11 kg carcasses and cooked by different methods were investigated in 3 exp. Cooked goat rib roasts had more lean, less fat and more bones than sheep rib roasts. Significant species x cooking method interaction was observed for cooked meat characteristics. Among moist heat cooking methods, stewing suited the mutton better and pressure cooking caused toughness. For chevon, pressure cooking resulted in better lean retention and water-holding capacity. Dry heat cooking methods like broiling and roasting caused less than retention and higher cooking losses in chevon than mutton. AS

Sheep

408 Mahendrakar (NS), Dani (NP), Ramesh (BS) and Amla (BL). Effect of post-mortem chilling and sheep carcass conditioning on extractability and fractions of muscle proteins. Journal of Food Science and Technology, India 26(5); 1989; 265-268

Eleven Bannur ewes (age: 4-5 yr, live wt. 22.30 plus or minus 2.0 kg) were sacrificed and carcasses slit vertically into two halves. The half-carcasses were subjected to either (i) achilles tendon suspension at 2-3 C for 24 h (direct chilling C_1), (ii) Pelvic suspension at 26 plus or minus 2 C for 7 h (7 h, RT), (iii) pelvic suspension at 26 plus or minus 2 C for 7 h followed by chilling at 2-3 C for 17h (delayed chilling, C_2) or (iv) left untreated (fresh, F). Semi-membranosus and semi-tendinosus (thigin) muscles of F-, 7 h RT-, C_1 and C_2 -carcasses as well as neck muscle held at 2-3 C were used for the study. The results revealed that during post-mortem chilling the extractability of muscle proteins in buffer of ionic strength $u = 0.55$ decreased initially upto 6 h followed by slight increase at 25 h postmortem and these changes were primarily due to changes in myofibrillar fraction. Contraction/stretching of muscles due to carcass conditioning treatments had 3 marginal ($P < 0.05$) effect on extractability in buffer of high ionic strength ($\mu = 0.55$) as well as in alkali, whereas extraction in buffer of low ionic strength ($\mu = 0.05$) was significantly ($P < 0.05$) lower in 7 h RT and C_2 muscles due to partial denaturation of sarcoplasmic proteins. AS

Pork

409 Swatland (HJ). Selection of wavelengths at which to measure paleness in pork by fiber-optic spectrophotometry. Canadian Institute of Food Science and Technology Journal 21(5); 1988; 494-500

Products

Bacon

410 Fiddler (W), Pensabene (JW), Foster (JM) and GatesRA). N-nitrosothiazolidine and N-nitrosothiazolidine 4-carboxylic acid in dry cured bacon. Journal of Food Safety 9(4); 1989; 225-233

N-nitrosamines in dry cured bacon were determined. The N-nitrosothiazolidine content ranged from none detected to 22.3 p.p.b.; N-nitrosothiazolidine-4-carboxylic acid ranged from 7 to 6478 p.p.b. It was also evident that the processing conditions may favour the formation of N-nitrosothiazolidine-4-carboxylic acid. KMA

Bologna

411 Swatland (HJ). A brief study of the effect of nitrite on bologna colouration measured with a colormet fiber-optic spectrophotometer. Canadian Institute of Food Science and Technology Journal 21(5); 1988; 560-562

A commercially available portable spectrophotometer with a fiber-optic probe and a photodiode-array (Colormet meat probe) was used to measured the reflectance spectra of bologna manufactured with and without added nitrite. The addition of nitrite was associated with lower ($P < 0.01$) reflectance at 400 and 410 nm, and with higher reflectance at 430 and 440 nm and from 600 to 700 nm. Similar results were obtained independently with an optical bench spectrophotometer. An isobestic point at 580 nm might be used to measure nitrite-related redness with a ratio, 670/580 nm. AS

Poultry

Chickens

412 Anand (SK), Pandey (NK), Mahapatra (CM) and Verma (SS). Effect of storage on microbial quality of dressed chicken held at -18 C. Journal of Food Science and Technology, India 26(5); 1989; 296-297

The effect of storage on microbial quality of dressed chicken held at -18 C was studied. Evicerated, whole broiler carcasses were aged at 5 C for 4.8 and 24 h and then frozen stored at -18 C. Microbiological examination was carried out at monthly intervals for 6 months. It was seen that the ageing process carried out prior to freezing resulted in an increase in the microbial load on the carcasses. But during frozen storage a gradual decrease was noticed in different microbial counts. The chicken carcasses were found to be acceptable after 6 months of frozen storage and no Salmonella was isolated from any of the samples. NGKR

413 Harrison (MA) and Carpenter (SL). Survival of Listeria monocytogenes on microwave cooked poultry. Food Microbiology 6(3); 1989; 153-157

The survival of Listeria monocytogenes on poultry processed in a microwave oven was assessed. Chicken breasts were inoculated with approx. $10^5 - 10^7$ L. monocytogenes Scott A/g, cooked to one of five different internal temp. vacuum packaged or wrapped in an oxygen permeable film and stored for up to 4 wks at 4 C or 10 days at 10 C. Although each heat treatment used decreased the Listeria population, survivors were encountered at each cooking temp. At higher temp. (73.9, 76.7 and 82.2 C), the population was initially reduced 2.5-3.8 logs, whereas the lower cooking temp. (65.6 and 71.7 C) resulted in a less than 2-log cycle reduction. The L. monocytogenes population in samples stored at 4 C was approx. the same or slightly greater than the post-processing level after 4 wks. In samples stored at 10 C, the microbial population was re-established within 10 days to levels at least as great as that initially inoculated onto the chicken breasts. Differences due to packaging were observed at both storage temp. AS

414 Schnepf (M) and Barbeau (W). Survival of Salmonella typhimurium in roasting chickens cooked in a microwave, conventional microwave and a conventional electric oven. Journal of Food Safety 9(4); 1989; 245-252

Fresh whole roasting chickens were inoculated with Salmonella typhimurium and cooked on a microwave, convection microwave, or conventional electric oven to 74 to 85 C. It was observed that the chicken cooked at 79 and 85 C in microwave showed positive for Salomonella. KMA

415 Smolinska (T), Kopec (W) and Trziszka (T). Effect of skin addition on the technological properties of comminuted chicken meal emulsion. International Journal of Food Science and Technology 23(5); 1988; 441-446

The functional and rheological properties of meat emulsions made from broiler chicken breast meat, with addition of leg meat or of skin as the binding agent have been compared with those made from the individual muscles. Results indicate that 5% skin added to the comminuted breast muscles resulted in the collagen content equal to that obtained with 40% leg muscles. Addition of 5% skin to the breast muscles decreases emulsifying capacity of protein extracts but increases thermal stability, and changes the flow curve and meat more than the addition of dark muscles. No changes in binding and sensory properties of skin supplemented sausages was noticed, but reduction in water holding capacity and palatability was observed. SRA

Turkeys

416 Richardson (RI) and Jones (JM). The effects of salt concentration and pH upon water-binding, water-holding and protein extractability of turkey meat. International Journal of Food Science and Technology 22(6); 1987; 683-692

The effects of salt concn. and pH upon protein extractability and water-binding by homogenates of turkeys breast, thigh and drumstick meat, and also the effect of salt concn. and centrifugal force upon water-binding of raw meat and water-holding of cooked meat from breast and thigh were studied. Concn. of sodium chloride above 0.3 M caused swelling of meat homogenates. With the pH values adjusted to 6.0 and with sodium chloride concn. greater than 0.6 M, breast meat was able to swell more than leg meat. Water-binding increased with increasing pH value. Breast meat homogenates had more extractable protein than leg meat homogenates and protein extraction was increased by increasing both salt concn. and pH. Cooked breast meat retained more water then leg meat with or without salt. At low concn. of salt, cooked breast meat retained more water than raw meats, but this was reversed at higher salt concn.. AS

Products

Eggs

417 Schott Beyer (R) and Jensen (LS). Over estimation of the cholesterol content of eggs. Journal of Agricultural and Food Chemistry 37(4); 1989; 917-920

In this investigation the comparative results of cholesterol detn. in egg extracts by different methods have been presented as it is reported that the data by colorimetric methods are effected by interfering non-cholesterol substances. It has been found in these studies that the HPLC method resulted in a cholesterol content of 10.97 mg/g wet yolk as compared to 13.86 mg/g wet yolk estimated by colorimetric method with saponified yolk extracts. Recovery of added cholesterol to yolk samples was almost quantitative. It is also seen that by separation of the cholesterol from the remaining unsaponifiable yolk fraction by HPLC revealed that 17.5% of the chromogens present in the colorimetric assay were in the non-cholesterol fraction. It is therefore indicated that a reevaluation of the cholesterol content in eggs has to be carried out using methods based on prior purification of the cholesterol fraction from impurities prior to estimation. NGKR

Quail eggs

418 Singh (RP), Anand (SK) and Panda (B). Storage stability of brined quail eggs. Indian Journal of Poultry Science 24(2); 1989; 81-85

Cooked and peeled quail eggs were held either in 4% brine solution alone or brine solution containing 4% common salt, plus 0.4% citric acid and 0.2% sodium benzoate (acidified brine solution) and stored at refrigeration temp. (5 plus or minus 1 C) for 8 wk. Eggs immersed in acidified brine solution had lower pH than those dipped in salt solution. Difference in the pH of the brine solutions was found to have no influence on the diffusion rate of salt into the egg components. Thiobarbituric acid value increased and sensory quality declined in brined quail eggs in 8 wk of storage time. Incorporation of citric acid and sodium benzoate retarded the multiplication of halophilic bacteria and fungi without imparting organoleptically perceptible sourness in the brined eggs and extended their shelf-life up to 8 wk compared to 4 wk in brine solution. KAR

SEAFOODS

419 Redmayne (PC). World aquaculture developments. Food Technology 43(11); 1989; 80-81

This article briefly gives the latest trends in farmed seafood. Covers Finnish aquculture (shrimp, salmon, catfish, crawfish, trout, three other finish species), shellfish aquaculture (oysters, bluemussels, clams, abalone and scallops). SRA

420 Rodrick (GE) and Cheng (TC). Parasities. Occurrence and significance in marine animals. Food Technology 43(11); 1989; 98-102

Article summrises the present status of our knowledge of human parasites that are transmissible by seafood to humans. Covers protozoa, trematoda (heterophyids, troglotrematids, echinostomatids, microphallids, schistosomatids) Cestoda, acanthocephalan, nematodes (Anisakids, trichinellids, philometrids) and parasitism measures for control. SRA

421 Ward (DR). Microbiology of aquaculture products. Food Technology 43(11); 1989; 82-86

This article addresses to several potential microbiological issues, discussed in terms of practice of aquculture production, the pathogens and other organisms affecting fish or humans, and the development of microbial resistance to antibiotics. 69 references. SRA

Shrimps

422 Srinivasa Gopal (TK), Iyar (TSG), Prabhu (PV) and Gopakumar (K). Alternate code slip for frozen shrimp packaging. Seafood Export Journal 22(2); 1990; 7-9

The code slip used in frozen shrimp packages are of paper make which gets multilated while thawing the blocks for reprocessing. Investigation carried out for replacing this with polyester tracing sheet of 150 gauge thickness showed that the physical properties like bursting strength, tearing strength, tensile strength, air permeability are comparable with that of paper slip. The additional cost of polyester code slip will be 3 to 4 paise and the slip remains in good condition for use in the frozen shrimp for export. KAR

Fish

423 Madhusweta Das and Chattoraj (DK). Quality characteristics of noodles enriched with salt extracted fish protein. Journal of Food Science and Technology, India 26(5); 1989; 272-276

The cooking quality of noodles prepared from wheat flour blended with fish protein isolate and tapioca starch has been compared with that of commercial samples in this investigation. The quality was evaluated by cooking test and sensory evaluation. Results showed that wheat flour noodle with 3% fish protein was found to be more acceptable in respect to overall quality whereas high cooking losses were noticed in noodles containing pregelatinised tapioca starch. NGKR

424 Parry (RWH), Alcasid (MV) and Panggat (EB). Cold shock in fish. Its characteristics in bighead. International Journal of Food Science and Technology 22(6); 1987; 637-642

A strong cold shock effect was demonstrated in bighead, and this was contrasted with the absence of any such effect in rainbow trout. The influence of chilling temp. and delayed icing on this effect was investigated. Bighead exhibited only weak rigor, which could be distinguished from the profound stiffening that followed icing. The degree of cold shock was similar when fish were chilled to 0, 2, 5, amnd 11 C, but the effect was not observed at 15 or 30 C. Bighead that were allowed to remain at ambient temp. before icing exhibited less pronounced stiffening when iced; the longer these periods at ambient temp., the less rigid the fish became when iced. Fish allowed to enter rigor showed no increase in stiffness when subsequently iced. AS

425 Sachindra (SM) and Karunasagar (I). Fractionation of extract from seeds of Adenanthera pavonia and effect of these fractions on fish spoilage bacteria. Journal of Food Science and Technology, India 26(5); 1989; 283-285

The fraction of extract from seeds of Adenanthera pavonia and effect of these fractions on fish spoilage bacteria has been studied in this investigation. The crude extract of Indian red woodseeds (Adenanthera pavonia) was separated into 3 main fractions viz. DC-IF, DC-II F and DC-II F by DEAE-cellulose chromatography. Only DC-II F was found to have protease inhibitor (PI) activity and DC-IF which contained ketones inhibited the activity of fish spoilage bacteria to reduce trimethylamine oxide and to produce hydrogen sulphide from cysteine. NGKR

Bluefish

426 Armbruster (G), Gall (KL), Gutenmann (WH) and Lisk (DJ). Effects of trimming and cooking by several methods on polychlorinated biphenyls (PCB) residues in bluefish. Journal of Food Safety 9(4); 1989; 235-244

The mean concn. of PCBs in the raw untrimmed fillets of the fish was 1.76 p.p.m. on a dry wt. basis. Twice the concn. of PCB's were found in the skin as compared to dorsal and ventral sections. Trimming the fillets resulted in reduction of PCB's residue. Baking, boiling and frying also reduces PCB content. KMA

Catfish

427 Jhonsen (PB). Factors influencing the flavour quality of farm-raised catfish. Food Technology 43(11); 1989; 94-97

This article discusses the effects of feed ingredients (flavour of fresh fish, flavour of frozen, stored fish), effect of environment, definition of flavour quality and ways to measure it (lexicon flavour descriptors, quantitative sensory analysis, sample presentation) and future needs. 17 references. SRA

Pomfrets

428 Fazal (AA) and Srikar (LN). Effect of accumulated free fatty acids on reduction of salt soluble proteins of pomfret and seer fish during

frozen storage. Journal of Food Science and Technology, India 26(5); 1989; 269-271

In this paper the effect of free fatty acids (FFA) released during frozen storage on protein solubility in seer fish and pomfret with varying amounts of total lipids has been reported. Two sp. of marine fish viz. seer fish (Scomberomorus guttatus) and pomfret (Pampus argenteus) purchased from Mangalore fish market, transported to lab. in iced condition, one inch thick steaks were made and at once frozen in a coil feezer. Packing of 500 g. steaks was done in frozen in a polyethene bags and stored at -20 plus or minus 2 C. Results showed that the FFA content increased rapidly followed by marked decrease of PL during frozen storage. There was also found marked decrease of salt soluble protein throughout the storage period especially during the first 30 days whereas SSP seemed to level off beyond 150 days. It has been shown that FFA released during storage caused protein denaturation. NGKR

Sucker

429 Owusu-Ansah (YJ), McCurdy (AR) and Kopp (TG). Viscosity changes of actomyosin and properties of surimi from sucker (Catostomus commersoni). Canadian Institute of Food Science and Technology Journal 21(5); 1988; 531-533

The viscosity of sucker actomyosin solutions decreased with increasing temp. up to 38 C, then rapidly increased; peaking at 43 C. The gelation of sucker actomyosin was similar to those of other fish used in the surimi industry. Kamaboko prepared from sucker surimi was rated as grade A in fold tests and remained unchanged during four wks of refrigerated storage. The hardness of the kamaboko significantly increased with storage but did not adversely affect the quality as judged by the fold test. AS

Trouts

430 Stone (RA) and Kinsella (JE). Bleaching of beta-carotene by trout gill lipoxygenase in the presence of polyunsaturated fatty acid substrates. Journal of Agricultural and Food Chemistry 37(4); 1989; 866-868

The 12-lipoxygenase (LO) from trout gill effectively bleaches beta-carotene in conjunction with the peroxidation of different polyunsaturated fatty acid (PUFA) substrates. The max. velocity of bleaching differed significantly between LO from gill and the 15-LO from soybean for six PUFA substrates, compared to linoleic acid. The lag times before reaching max. velocity of bleaching were shorter for trout gill LO than were those catalyzed by soybean LO for six of the eight PUFA substrates tested. This may reflect the presence of oxidative cofactors in the trout gill LO preparation. AS

Products

Fish

431 Akande (GR), Knowles (MJ) and Taylor (KDA). Improved utilization of flesh from mackerel as salted dried fish cakes. International Journal of Food Science and Technology 23(5); 1988; 495-500

The comp. and yield of mince prepared by passing mackerel (S. scombrus) frames through a flesh-bone separator were determined. Salt (10 to 40%) was added to the unwashed mince to prepare dried cakes with enhanced keeping quality. The dried cakes were assessed for peroxide and TBA values, total viable count and for sensory attributes after preparation and after a 3-month storage period at 29 plus or minus 1 C. The cakes were reconstituted by desalting in boiling water. Salted dried cakes prepared with 15, 20, 30 and 40% salt were found to be stable and have little sensory deterioration over the 3-month storage period which is adequate to simulate distribution of products at tropical ambient temp. AS

Fish sauces

432 Velayutham (P) and Jegatheesan (G). Effect of solar radiation on fish sauce. Indian Journal of Nutrition and Dietetics 25(10); 1988; 311-314

The quality of fish sauce produced at ambient temp. and after exposing to sunlights has been studied. Samples of fish sp. (Leiognathus equulus) along with slightly spoiled fishes were mixed with salt in 2:1, 3:1 and 4:1 ratios and fermented at ambient temp. and another set exposed to sunlight for 10 h daily. Fish fermentation was done in plastic containers of 51 capacity, crude filter paper or cotton was used to filter the clear liquid from the fermented samples. The fish sauce samples collected at the end of 3 and 6 months were analysed for pH, salt, solids, protein, amino-N, trimethylamine (TMA), total volatile N (TVN), and total volatile acid (TVA). The protein and amino N values of sauce samples produced using solar radiation (38 C) showed a higher value than ambient temp. (28 C). The values of TMA and TVN for both temp. were also within acceptable level. The 4:1 ratio was found to be the best as well as the one produced from solar radiation in respect to protein and amino N level. NGKR

PROTEIN FOODS

Nil

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

433 Nagel (CW) and Herrick (IW). The effect of malate or lactate content on the pH - TA relationship of potassium bitartrate saturated alcohol-

water solutions. American Journal of Enology and Viticulture 40(2); 1989; 81-85

To show the effect of organic acid comp. on pH and titratable acidity (TA), an algorithm was derived using the dissociation constants of the acids determined in 0%, 10%, and 20% (v/v) ethanol solutions and the solubility product of potassium bitartrate. Using published solubility products for potassium bitartrate solutions and assuming a 0.15% concn. for succinic acid, the effect of variation of the concn. of malic or lactic acid on TA and tartrate and K^+ content in ethanol/water solutions at different pH values could be calculated with the formulas and computer. Tables were constructed showing the predicted malic or lactic acid content in ethanol/water solutions at a particular TA and pH. AS

Alcoholic beverages

Beer

434 Calderbank (J) and Hanmonds (JRM). Influence of nitrate and bacterial contamination on the formation of apparent to fat -N- nitroso compounds (ANTC) during fermentation. Journal of the Institute of Brewing 95(4); 1989; 277-287

Formation of Apparent Total N-Nitroso Compounds (ATNC) was monitored throughout fermentations of all-malt ale worts supplemented with nitrate (0.100 mg litre (0.100 p.p.m.). The pitching yeasts were obtained from commercial breweries and contained different levels of the contaminant bacterium Obesumbacterium proteus (0-2.1% by number). Levels of ATNC present at the end of fermentation were dependent on both initial wort nitrate levels and the initial level of bacterial contamination of the pitching yeast. Only relatively low nitrate levels were required to produce ATNC levels greater than the Brewers Society recommended limit of 20 ug litre (p.p.b), provided that the bacteria were prsent. Indeed, the use of whole hops alone would contribute sufficient nitrate to the wort to produce excessive amounts of ATNC, provided O. proteus was present. The only feasible solution to ATNC production during fermentation is to remove the contaminating bacteria from both the pitching yeast and brewing plant. Effective removal of O. proteus can be achieved by acid washing the pitching yeast under carefully controlled conditions, prior to fermentation. AS

435 Delcour (JA), Hennebert (MME), Vancraenenbroeck (R) and Moerman (E). Unmalted cereal products for beer brewing. Part I. The use of high percentages of extruded or regular corn starch and sorghum. Journal of the Institute of Brewing 95(4); 1989; 271-276

Debranned sorghum, debranned extruded sorghum, corn and corn starch were used as brewing adjuncts (50%) in a micro brewing process and the quality of beer was evaluated. Infusion mashing method was followed to prepare wort. Filteration time for corn starch and extruded corn starch was 90 min. for both and debranned sorghum for 180 min. whereas mash from extruded sorghum was of gel consistency and necessiated decantation. The formation of lipid amylase complex during extrusion caused higher saccarification time and imparted slight turbidity to wort. Beer prepared from debranned sorghum, corn starch and extruded corn starch were comparable to all malt beer where as that prepared with extruded sorghum was found to have unacceptable aroma. NGM

436 Sanni (AI). Chemical studies on Sekete beer. Food Chemistry 33(3); 1989; 187-191

The chemical comp. of sekete beer and the maize used in its preparation are reported. Apart from Ca, decreases in the values of P, Mg, K and Na were observed in the beer. Riboflavin and niacin contents increased at the end of fermentation while thiamine decreased slightly. An increase in the moisture, N and protein contents is reported. The ash and crude fibre contents, however, decreased. AS

437 Ybanez (N), Navarro (A) and Montoro (R). Determination of cadmium, cobalt, copper, lead, and zinc in beer by flame atomic absorption spectroscopy. Journal of the Institute of Brewing 95(4); 1989; 257-262

Wines

438 Drysdale (GS) and Fleet (GH). The growth and survival of acetic acid bacteria in wines at different concentrations of oxygen. American Journal of Enology and Viticulture 40(2); 1989; 99-105

The growth of Acetobacter aceti, A. pasteurianus and Gluconobacter oxydans was examined in three wines held at 100%, 70% and 30% to 50% dissolved oxygen and correlated with changes in concn. of wine sugars, alcohols, organic acids, acetaldehyde, and ethyl acetate. Both A. pasteurianus and A. aceti grew to populations of 10^8 cfu/mL in fully aerated wines. Weaker growth occurred at lower dissolved concn. Growth was accompained by reductions in the concn. of ethanol and increases in the concn. of acetic acid. Other changes included reductions in the concn. of some organic acids and glycerol and increases in the concn. of acetaldehyde and ethyl acetate. Gluconobacter oxydans did not grow in the wine samples. AS

439 Nagel (CW) and Weller (KM). Colorimetric determination of urea in wine. American Journal of Enology and Viticulture 40(2); 1989; 143-144

A colorimetric method for the analysis of urea in wine and juices, capable of accurately estimating the urea content at concn. as low as 1 mg/L, is described. Nitrogen compounds other than carbamido compounds do not interfere with the reaction. AS

440 Sponholz (WR), Dittrich (HH) and Bausch (N). Volatile fatty acids in fruit wines, fruit desert wines and fruit brandies. Deutsche Lebensmittel-Rundschau 85(8); 1989; 247-251 (De).

Fruit and fruit dessert wines, as also fruit brandies were analysed on their free volatile acid comp. As expected, acetic acid is the main component. Often formic acid is analysed in high concn. depending on mold metabolism. The other volatile acids are found in fruit wines in minor amounts or are not detected. The higher amount of 2-methylbutyric acid compared to 3-methylbutyric acid is noticed in apple products. This phenomenon is found also in French and German apple destillates in a ratio up to 4.3:1. In Calvados propionic acid is clearly higher than in German brands. In destillates of Williams pears the amount of 2-methylbutyric acid is up to 107:1 higher than that of the other isomer. Whereas in other pear destillates it is comparable with apples. Also in apricot brandies 2-methyl- is higher than 3-methylbutyric acid and also propionic and butyric acid may be high. In a spoiled product propionic-, butyric-and 2-Methylbutyric acid are extremely high. Destillates from plums mainly show low concn. of free volatile fatty acids. But only in one Slivowitz 69 mg/l of butyric acid was analysed comparable with the literature values. Destillates from cherries are mainly poor in volatile acids, but propionic acid may be increased. Raspberry spirit only shows amounts of free fatty acid as pure spirit from grain. AS

441 Tegmo-larsson (IM), Spittler (TD) and Rogriguez (SB). Effect of malolactic fermentation on ethyl carbamate formation in Chardonny wine. American Journal of Enology and Viticulture 40(2); 1989; 106-108

Malolactic fermentation of a Chardonnay wine with five different strains of lactic acid bacteria (Leuconostoc oenos) showed no detectable amounts (< 10 µg/L) of ethyl carbamate. Heating of these wine samples, however, produced around 100 µg/L of ethyl carbamate. Control samples which had not undergone malolactic fermentation contained, after heating, amounts of ethyl carbamate similar to the malolactic-fermented samples. Removal of the yeast by sterile microfiltration did not affect the ethyl carbamate formation during heating. AS

Non-alcoholic beverages

Coffee

442 Blance (MB), Davis (GE), Parchet (J-M) and Viani (R). Chromatographic profile of carbohydrates in commercial soluble coffees. Journal of Agricultural and Food Chemistry 37(4); 1989; 926-930

An analytical method based on the chromatographic profile of instant coffee samples has been developed in order to know the type of coffee extraction conditions etc but also the nature of adulterants or additives used in these products. This has been found possible by detn. of both free and total sugar contents by HPLC, GC and TLC methods. The results showed that pure soluble coffee irrespective of the extraction conditions contained max levels of 0.3% total xylase and sucrose about 2% total glucose and absence of maltose. Some samples showed higher levels of one or more of the above sugars. Higher quantities of total xylose indicated use of coffee husks and parchment. The extent of free fructose and glucose distinguished use of either raw or roasted husks. The indication of addition of maltodextrins is shown by high levels of maltose and total glucose whereas addition of caramelised sugar increased the levels of sucrose and total glucose. NGKR

443 Menon (SN). Quality improvement on the estate and processing technology in coffee. Indian Coffee 53(12); 1989; 15-20

This article covers various aspects in farm processing of coffee which includes selection of uniformly ripe berries, pulping, demucilaging or fermentation, removal of mucilage by alkali and by friction, washing with water and drying and storage. These processing steps as practised in India are compared with some other countries like Kenya, Mexico and Brazil and indications have been given as to how good processed coffee could be got. In drying, it is suggested that mechanical drying gives good coffee compared to sun-drying and procedure to be followed in mechanical drying of coffee is indicated. KAR

Fruit juices

Lime juices

444 Narendra Mohan and Ashutosh Bajpai. Use of lime in juice purification - a panorama. Indian Sugar 39(10); 1990; 739-743

The factors influencing the quality of the lime including the working of lime kiln, process involved in the preparation of milk of lime and how the quality of juice determined, the extent of milk of lime needed for clarification are the aspects covered. KAR

Orange juices

445 Parish (ME) and Higgins (DP). Extinction of Listeria monocytogenes in single-strength orange juice. Comparision of methods for detection in mixed populations. Journal of Food Safety 9(4); 1989; 267-277

The FDA method of selective enrichment followed by selective plating on modified MC Bridge agar was capable of detecting the presence of L. monocytogenes in a reconstituted single strength orange juice at the 10^{6} cfu/ml level. KOH treatment was required for Listeria detection in juice which had high background microflora (10^{8} cfu/ml). KMA

446 Skurray (GR), Luckman (GJ) and Leach (D). Folic acid and ascorbic acid content of concentrated and single strength orange juice. ASEAN Food Journal 4(2); 1988; 77-78

FATS AND OILS

447 Mazza (G) and Marshall (HH). Onosmodium seed, a potential source of gamma-linolenic acid. Canadian Institute of Food Science and Technology Journal 21(5); 1988; 558-559

Seeds of Onosmodium hispidissimum Mack., collected at three locations in southern Manitoba, were analyzed for seed characteristics, oil content and fatty acid comp. Whole seed contained 16.7 to 18.4% oil of which over 22% was gamma-linolenic acid (18:3). The other fatty acids present in the oil were palmitic (16:0), stearic (18:0), oleic (18:1), linoleic (18:2), alpha-linolenic (18:3), tetraenoic (18:4) and eicosenoic (20:1) acids. The seeds of O. hispidissimum contained 2.8% more gamma-linolenic, 2.6% more linoleic and 4.4% less oleic acid than those of O. occidentale Mack., a previously characterized source of gamma-linolenic acid and may find application in the health food and pharmaceutical industry. AS

Fats

448 Hunt (C), Burn (P) and Adamczuk (ZC). Proximal composition and fat type of three popular take-away meals. International Journal of Food Science and Technology 22(6); 1987; 669-675

Random samples of three popular types of take-away meal (fish and chips, chicken chow mein and meat curry) were bought from various outlets in a town in the North of England. They were analysed for protein, sodium and amount and type of fat. The fat content of the fish and chips was very high, and less high in the chow meins and curries. In all three types of meal, the fat was mainly saturated and monounsaturated, although in the fish and chip samples the saturated fraction was particularly high; traditionally they are fried in beef dripping. Although the amount of polyunsaturated fatty acid (PUFA) is lower in products fried in oil, preliminary results from this study suggest that up to half of this may be in the trans-form; this is alleged to be no better than saturated fatty acid in effect on blood cholesterol. The study clearly indicates wide variation in both amount and type of fat within one meal type, and throws serious doubt on the feasibility of implementing meaningful nutritional labelling information in take-away outlets. The amount of sodium in the Chinese meals was particularly high. AS

449 Perez-Camino (MC), Marquez Ruiz (G), Salgado Raposo (A) and Dobarganes (MC). Frying fat alteration. III. Correlation between analytical indices and methods for the direct evaluation of degradation compounds. Grasas Y Aceites 39(2); 1989; 72-76

In this study, the possibilities for the analysis of used frying fats using simple and rapid analytical indices are defined in comparison with chromatographic methods that quantify the new compounds originated during the thermoxidative process. 140 samples have been evaluated using the following detn.; polar compounds, polar methyl esters, non polar dimers, free fatty acids, smoke point and Perevalov colorimetric test. The samples were divided in 3 groups depending on their origin (thermoxidised oils and frying fats coming from both domestic and industrial fryers) and correlations between the different detn. were calculated for each group and for all the frying fats. The results demonstrate that the selected indices can only be applied when constant values for the parameters affecting the fat during deep frying are established and that it is necessary to use a chromatographic method for the evaluation of samples of unknown history. AS

Butter

450 Ulberth (F) and Blineder (S). Determination of copper and iron in butter by atomic absorption spectroscopy. FAT Science and Technology 91(5); 1989; 185-188

A pressurized digestion method for the detn. of trace of Cu and Fe in yellow fats (butter) by atomic absorption spectroscopy is described. As the specimen is only in contact with inert materials (PTFE) in a closed system during the digestion period contaminations are minimal. The repeatability of the method, expressed as relative standard deviation, was 7.13% for Cu and 8.56% for Fe. Standard recovery was better than 95% for both elements. The Cu and Fe content of 128 Austrian butter samples evaluated with the described procedure averaged 0.025 p.p.m. Cu and 0.167 p.p.m. Fe resp. AS

Butterfat

451 Younes (NA) and Soliman (MA). Adulteration of butterfat. Trans-unsaturation content. Crasas Y Aceites 39(2); 1988; 69-71

The trans-unsaturation content of 30 samples of milkfat ranged from 4.14% to 7.57% with an average 5.68%; Max. values were obtained in May, August and December. Min. values were recorded in February, March and July. It is concluded that the level of trans-unsaturation in milkfat is influenced by the nutrition level and the level of unsaturated lipid presents in pasture that increases the unsaturated dietary lipids consumed. The use of hydrogenated cottonseed oil as an adulterant for the authentic milkfat was carried out. The hydrogenated cottonseed oil was added to the bulk milkfat in the ratios of 10%, 20% and 30%. The trans-unsaturation content of hydrogenated cottonseed oil was 25.40%. The addition of hydrogenated cottonseed oil to milkfat in the ratio of 10% w/w increased the trans-unsaturation content of the bulk milkfat from 5.30% to 8.88%, the trans-unsaturation content of the milkfat was increased to 10.72% and 14.45%, when the added hydrogenated oil was 20% and 30%, resp. AS

Oils

452 Byrne (M). The changing face of oils and fats. Food Manufacture 64(1); 1989; 31-37

This article presents an overview of the changing market for yellow fats and cooking oils and fats. SRA

453 Kaimal (TNB) and Saroja (M). Modification of vegetable oils by lipase catalyzed interesterification. Journal of the Oil Technologists" Association of India 21(1); 1989; 2-10

Lipase catalyzed interesterification (acidolysis) was investigated to modify groundnut oil (GO), mustard oil (MO), coconut oil (CO) and soybean oil (SO), to improve the nutritional qualities and shelf-life. Lipase from Rhizopus delemar in free form and lipase form Mucor miehei and porcine pancreatic lipase were used in the immobilized form. With Rh. delemar lipase, SO, MO and GO were modified with lauric and oleic acids. Interesterification of SO and MO reduced the linolenic acid marginally; in GO, the content of long chain acid decreased from 6.0 to 3.7%. With pancreatic lipase the SO interesterified with lauric acid, the extent of incorporation of lauric acid was comparable to that obtained with Rh. delemar lipase, but the reduction in linolenic acid content was better. Interesterification reaction rate decreased with increase in temp. (tried 40, 50 and 60 C). Interesterification of SO with the three enzymes could not reduced the linolenic acid content. Interesterification of vanaspathi with different molar proportions of short chain acids in packed bed of lipozyme at 60 C indicated that the incorporation of butyric acid was negligible; but there was slight improvement in flavour as revealed by sensory evaluation tests. The fried product left a greasy feeling in the mouth. Interesterification of CO to improve the linolenic acid with a mixture of 10:0 (8.6 g) and 14:0 (11.4 g) and safflower oil (10 g) in a continuous reaction with lipozyme at 60 C gave a product with linolenic acid content of 8.2% and a total content of palmitic and stearic acid of 6.4%. Methanol did not exert any perceptible effect on the interesterification of CO. Extent of incorporation of 14:0 to CO was better at 60 C than at 50 C. Addition of about 0.2% water to the oil-fatty acid mixture showed a higher incorporation of the added fatty acid. KAR

Amaranthus seed oils

454 Becker (R). Preparation, composition and nutritional implication of amaranth seed oil. Cereal Foods World 34(11); 1989; 950-953

This review article provides information on the physical and chemical characteristics of amaranthus seed and preparation, comp. and nutritional implication of amaranthus oil. PHR

Palm oils

455 Arumughan (C), Sundaresan (A), Prasad (KVSV), Damodaran (AD) and Nampoothiri (KUK). Studies on the extraction and evaluation of raw palm oil for edible use. Journal of Food Science and Technology, India 26(5); 1989; 277-282

Design data for the fabrication of palm oil extraction equipments for small scale units and manufacturing details for production of edible grade raw palm oil as a nutritional oil have been presented in this paper. Pilot plant trails with fresh fruit bunches harvested from CPCRI, Trivandrum have been conducted and it was seen that the palm oil produced had less than 1% free fatty acids, 0.2% moisture and impurities. The oil was found to be of high quality as shown by analytical values and as it continued 700 p.p.m. carotenes was good source of vitamin A. Technical know how for manufacturing of 0.7 tonnes capacity of fresh fruit bunches per hour has been developed by CPCRI and a demonstration plant has also been set up at Trivandrum as a Joint venture of R.R.L. and CPCRI. NGKR

456 Parvathi Easwaran (P) and Sailaja (YS). Acceptability studies on selected recipes using raw palm oil. Indian Journal of Nutrition and Dietetics 25(11); 1988; 331-337

Imported palm oil is being recently used in India to meet the oil shortage. The acceptability, keeping quality and physico-chemical changes after cooking and storing were carried out with seven recipes prepared using raw palm oil. Potato chips, diamond cuts, ribbon pakodas, chapaties, egg omlettes tamarind rice and Bengal gram sundal were evaluated by a panel of judges aged 20-35 yrs. Some recipes were tested for shelf-life and were evaluated after 5, 15 and 25 days of storage. Fresh palm oil and residual oil were analysed for sp. gr., viscosity, refractive index and acid value. Results were compared with that obtained from traditional groundnut oil. The findings revealed that palm oil had high viscosity 3,924 dynes cm , sp. gr. 0.9146, refractive index 1,4545 and free fatty acids 0.8415. Only in deep fat fried products the acceptability scores were statistically significant. Shelf-life of the products were comparable with those of groundnut oil products and the pattern of variation in physical constants was also similar to that of groundnut oil. Palm oil is well accepted for shallow fat frying and seasoning than deep fat frying. No undesirable changes were seen during cooking and storage. Palm oil is cheaper than groundnut oil. NGKR

Rapeseed oils

457 Kalmokoff (ML), Pickard (MD) and Groot Wassink (JWD). Resistance of green pigments in commercial canola oil to enzymatic hydrolysis. Canadian Institute of Food Science and Technology Journal 21(5); 1988; 534-536

Bleaching of degummed green canola (rapeseed) oil by means of enzymatic hydrolysis was studied. Green oil results from the processing of immature seed (Brassica napus). The green pigments comprise mainly pheophytins and minor amounts of chlorophylls. Pheophytins are derived from chlorophylls during the commercial crushing process. In buffer/acetone solution, chlorophylls and pheophytins were hydrolyzed by chlorophyllase. However, in the presence of oil, chlorophyllase hydrolyzed only the chlorophylls and not the pheophytins. AS

Rice bran oils

458 Raghuram (TC), Rao (UB) and Rukmini (C). Studies on hypolipidemic effects of dietary rice bran oil in human subjects. Nutrition Reports International 39(5); 1988; 889-895

The hypolipidemic action of dietary rice bran oil (RBO) was investigated in human subjects. Twelve subjects either with high serum cholesterol or high triglycerides were advised to use RBO in place of other cooking oils which they were using earlier. There was a significant reduction in serum cholesterol and triglyceride levels after 15 and 30 days after the use of RBO in the diet. In nine control subjects there were no changes in the serum cholesterol and triglyceride levels. RBO could be considered as a edible oil of preference for patients with abnormalities of lipid metabolism. AS

459 Sarkar (S) and Bhattacharyya (DK). Studies on characteristics of rice bran. Journal of the Oil Technologists" Association of India 21(1); 1989; 11-12

Ten samples of rice bran collected from different growing areas of West Bengal (India) and Orissa (India) have been analysed for total lipid, protein and ash and the fatty acid comp. of the total lipid. The total lipid varied from 19.0 to 23.0%, ash from 12.3 to 18.6%, protein from 15.2 to 18.5% and sand/silica from 3.7 to 8.8%. The free fatty acid content was between 3.0 and 5.5% and the oils were also not very light coloured. The total lipid (oil) of the rice bran oil showed 16.3-21.4% palmitic acid, 39.8 to 47.5% oleic acid and 31.1-34.9% linoleic acid which are the major fatty acids. KAR

SPICES AND CONDIMENTS

Spices

460 Anon. R & D in spices - I. Indian Spices 26(2); 1989; 16-17

This is a brief review of the work done on spices at the Central Food Technological Research Institute, Mysore, covering areas like spices, oleoresins, super-critical extraction of spice oils, encapsulated spice flavours and spice mix slabs. KAR

461 Narvaiz (P), Lescano (G), Kairiyama (E) and Kaupert (N). Decontamination of spices by irradiation. Journal of Food Safety 10(1); 1989; 49-61

Inactivation of microflora of foreign spices by means of gamma-radiation was studied. Ground cinnamon, clove, coriander, nutmeg, white and black pepper were irradiated with 7 and 10 kGy of ^{60}Co. Microbiological results showed that aerobic plate count was reduced by 2.5 to 4.0 log cycles with 7 kGy. There was no difference in the sensory property due to irradiation. KMA

Juniper

462 Kallio (H) and Junger-Mannermaa (K). Maritime influence on the volatile terpenes in the berries of different ecotypes of juniper (Juniperus communis L.) in Finland. Journal of Agricultural and Food Chemistry 37(4); 1989; 1013-1016

In this paper the effect of the three forms of Juniperus communis L. in Finland and the influence of maritime environment on the comp. of the berry volatile oils have been studied and the results presented. The juniper berries and widely used on spice mixtures, perfumes and pharamaceutical products and their volatile oils are used in alcohol and beverage industry and their quality differences are due to biological variations. The volatiles are isolated by steam distillation and total volatiles are determined together with their GC-MS analytical studies. The results showed atleast 0.4-2.5% volatile compounds calculated on fresh wt. basis and 0.5-4% on a dry wt. basis. The quantities and relative percentages of humulene and of the sum of beta-elemene, caryophuyliene, and terpinen-4-ol decreased gradually from the maritime growth site toward the coast. The relative percentage of alpha-terpinolene, also showed similar trend. NGKR

Pepper

463 Lawless (H). Pepper potency and the forgotten flavour sense. Food Technology 43(11); 1989; 52, 57-58

The effects of pepper, future outlook on hot spices, their continued popularity, and advantages offered by them are discussed. Covers var. of pepper, sensory measurement of pepper, heat, physiological reactions to pepper, psychophysical studies, anesthetic properties and future outlook. SRA

464 Verghese (J). White pepper-the "Topless" Piper nigrum L. berries. Indian Spices 26(2); 1989; 19-24

A description is given of the green pepper retting process for preparing white pepper by traditional method; the steam blanching process, the black pepper retting process, and sterilization are included. Specifications for white pepper; the oil and piperine content; oleoresin extraction, organoleptic quality, and preference of white pepper in West European countries are also covered. 47 references. KAR

465 Verghese (J). Solubilised, homogenised and emulsified black pepper oleoresin. Indian Spices 26(3); 1989; 16-18

Methods available for preparing soluble and emulsified black pepper oleoresin including the use of levulinic acid, anhydrous lactic acid. Fagen's process of homogenisation and a couple of patented processes on black pepper oleoresin have been covered. KAR

Turmeric

466 Viasan (AC Nirmala Menon (A), Madhusudhana Rao (I), Narayanan (CS), Mathew (AG). Chemical analysis of some cultivars of Curcuma longa Linn. Journal of Food Science and Technology, India 26(5); 1989; 293-295

As the relative curcuminoid content of Curcuma longa Linn. is important for the total colour. This investigation was carried out to study the comp. of the curcuminoids in different cvs of turmeric. Eleven cvs of turmeric were analysed for the three colouring pigments curcumin demethoxycurcumin and bis-demethoxy curcumin by TLC separation followed by UV/visible spectrometry. The results showed that the hybrid variety "PCT-10" was found to be promising for trade purpose and cultivation. The two mono terpenes alpha-pinene and beta-pinene were identified for the first time in the essential oils.

NGKR

SENSORY EVALUATION

Nil

FOOD STORAGE

467 Pai (TK) and Sastry (SK). Effects of refrigerated storage conditions on microbial activity of selected perishables. International Journal of Refrigeration 12(6); 1989; 350-353

The effects of storage temp. and high relative humidity on the microbial activity of mature green tomato (‘Dombito'), mushroom (‘Sylvan Hybrid White') and apple (Red Delicious') were investigated at three temp. (5, 10 and 15 C), and four different relative humidity levels (91, 94, 97 and 100%). Relative humidity effects were not found to be statistically significant for the ranges of variables investigated. The microbial counts for tomatoes were not very high during storage (< 650 colony forming units per cm^2), due in part to low initial counts. In mushrooms, the bacterial population was much higher (about 4 log scales) than the yeast and mould population throughout the storage period. These data also showed some evidence of a competitive relationship between bacterial and yeast and mould populations at 5 C. The final microbial count for apples at each temp. was less than 300 CFU per cm^2 AS

INFESTATION CONTROL AND PESTICIDES

Infestation control

468 Fargo (WS), Epperly (D), Cuperus (GW), Clary (BC) and Noyes (R). Effect of temperature and duration of trapping on four stored grain insect species. Journal of Economic Entomology 82(3); 1989; 970-973

Capturing stored grain insects with drop traps in wheat was affected by insect sp., grain temp., and trapping duration. These results were obtained using four insect sp. (Tribolium castaneum (Herbst), Sitophilus oryzae (L), Rhyzopertha dominica (F.), and Cryptolester ferrugineus (Stephens), three grain temp. (10.0, 21.1, and 32.2 C), and four trapping intervals (1, 2, 4, and 7 d). Higher grain temp. resulted in significantly more insects trapped when all sp. were combined. This significance is largely due to the highly significant numbers of C. ferrugineus captured at high temp. The other sp. followed the same pattern. At each temp., C. ferrugineus was caught in the greatest numbers and R. dominica in the least. S. oryzae and T. castaneum were captured in intermediate numbers. Across sp. longer trapping durations resulted in significantly more insects being captured. Across durations, C. ferrugineus was caught the most, R. dominica the least, with the other two sp. intermediate. Within sp., only C. ferrugineus showed significant differences in the number trapped among the sampling periods. The trend, however, was consistent for all insect sp. This study emphasizes the need to consider differences in insect sp., grain temp., and trapping durations when drop traps are used to estimate insect abundance. AS

469 White (NDG) and Loschiavo (SR). Factors affecting survival of the merchant grain beetle (Coleoptera: Cucujidae) and the confused flour beetle (Coleoptera: Tenebrionidae) exposed to silica aerogel. Journal of Economic Entomology 82(3); 1989; 960-969

Mortality of Oryzaephilus mercator Fauvel exposed to 0.72 mg/cm silica aerogel (SG-67) bound to paper was directly related to length of exposure of the insects and length of time between exposure and placement in food. Exposures of 15 S killed 97% of starved adults in 2 d, but mortality was low if adults had access to food within 2 h. As exposure times increased, insects survived only if food was available at shorter intervals. Type and quantity of food also affected mortality. Mortality of O. mercator adults exposed to SG-67 was greater on bread crumbs and whole rolled oats than on ground rolled oats. Starved Tribolium confusum Jacquelin du val required exposures of 6 h to SG-67 for complete mortality; the presence of food following exposure, rather than type or quantity, affected survival, although mortality was slightly higher on bread crumbs. Early larval instars of O. mercator and T. confusum were more susceptible than late instars, which responded to SG-67 in the same way as adults. Adults of both sp. exposed to SG-67 and subsequently held in inert cellulose powder died within 1-3 d, but many insects in ground rolled oats survived, probably because they had ingested and metabolized food and produced metabolic water. Adult O. mercator immobilized at 2.5 C during exposure to SG-67 for 4 h, then held at 25 C without food, were unaffected by the treatment. Exposures of O. mercator for 15-60 s to silica aerogel on an adhesive surface will effectively control these insects if they cannot find food immediately. T. confusum cannot be controlled with exposure times of less than 6 h. AS

BIOCHEMISTRY AND NUTRITION

470 Ihekorony (AI). A rapid in vitro enzymic and chromatographic predictive model for the in vivo rat-based protein efficiency ratio of mixed food proteins. Nahrung 32(8); 1988; 789-793

A nutritional quality index in the nature of an enzymatic protein efficiency ratio (E-PER) was computed from the amino acid data of 18 different food products by means of multiple regression equations. The regression was performed by setting amino acid values derived from enzymic hydrolysis of the food proteins as the independent variables with the rat based PER values as the dependent variables. The multiple regression gave the following equations. E-PER = - 3.02 + 0.14 (asp) + 0.15 (glu) - 0.18(pro) + 0.14 (ala) + 0.52(met) + 0.21(lys) +

0.09(arg) - 0.45(trp). The multiple correlation coeff. for this regression was 0.942 and the coeff. of variation was 88.7%. The prediction equation was tested on amino acid-PER data of 22 different foodstuffs and it successfully predicted (plus or minus 0.22) the PER of 17 and an effectiveness of 77.3%. AS

471 Ihekoroyne (AI). Estimation of the biological value of food proteins by a modified equation of the essential amino acid index and the chemical score. Nahrung 32(8); 1988; 783-788

A modified essential amino acid index equation incorporating a digestibility factor (MEAAI) and a chemical score index (CSI) were developed from the essential amino acid profile of 18 different food proteins hydrolysed by the combined but sequential action of papain and pronase E enzyme systems. The essential amino acid comp. of whole egg was used as a reference standard. The following equations were proposed: log MEAASI = 1/8 log (100a) in which a is the value of the limiting amino acid in the sample, and a_e is the corresponding value in whole egg. Both equations were used to calculate the biological value of different protein foodstuffs. There was a close agreement between values obtained using the equations and reported values for the same foodstuffs published in the literature. There was also a close correlations (r = 0.665) between data obtained using MEAAI and those obtained using CSI in estimating biological values, suggesting that either equation could be used reliably and solely to estimate protein biological value of foods. AS

472 Kanchana (S) and Shurpalekar (KS). Effect of fibre and phytate of regional diet on the apparent absorption of zinc in rats. Nutrition Reports International 39(4); 1989; 727-734

The effects of reducing the phytate content of the ragi based regional diet and addition of fibre as NDF, absorption, serum and femur concn. of Zn were studied in rats. The activity of intestinal phosphatases was also studied. The growth response of rats fed the regional diet was lower than those fed semisynthetic diet. Removal of phytate from the ragi diet did not result in an impaired growth response. Total absorption of Zn was lower on the semisynthetic diet than on the ragi based regional diet which contained higher amounts of Zn than the former diet. On similar Zn intakes, per cent absorption of Zn on the regional diet increased significantly, when the phytate content of the regional diet was reduced by phytase. Addition of NDF to the semisynthetic diet had no effect on the Zn absorption. The serum and femur Zn concn. in rats fed different experimental diets were within the normal range of values. In rats fed the regional diet, the alkaline phosphates and phytase activities were significantly lower than in those fed semisynthetic diet with and without NDF. Dephytinizing the regional diet increased the activity of the enzymes to levels observed on semisynthetic diets. AS

473 Sevenhuysen (GP) and Wadsworth (LA). Food image processing. A potential method for epidemiological surveys. Nutrition Reports International 39(3); 1989; 439-449

Measurement of food consumption for epidemiological surveys is subject to several errors, one of which is the quantification of individual intakes. A photographic procedure is described to decrease subjectivity in food amount measurements. The procedure uses trigonometric calculations of photographic coordinates to estimate separate vol. of the items shown. The principle of vol. calculation was tested in the lab., using a symmetrically shaped object and a series of 23 commonly eaten food items. Results show that mean estimates are close to actual amounts. The principle has been shown to perform within the accuracy often required for food consumption surveys. AS

474 Varela (P), Marcos (A) and Requejo (A). Evaluation of nutritive status in sportswomen assessment by immunocompetence. Nutrition Reports International 39(5); 1989; 949-955

There is scant evidence that physical activity is the major variable that affects energy expenditure and hence caloric and protein requirements. Interrelationships among immunity and nutrition have stimulated great interest and recently the immunocompetence has been used to evaluate nutritional deficiencies. The most prominent effects of nutritional deficiencies are observed on cell-mediated immunity. Therefore the aim of this work was to evaluate nutritional status throughout the immunocompetence in young women with different physical activity rate (12 training in sports and 13 maintaining sedentary habits). Total leukocyte and lymphocyte count as well as lymphocyte percentage were tested, and the following lymphocyte subsets; CD2, CD4, CD8, CD20 and NK cells were evaluated by Flow Cytometry. Leukocyte and lymphocyte counts and total B cell percentage significantly decreased but decreases in CD2, CD4, NK and CD4/CD8 as well as the increase in CD8 were not significant in sportswomen compared to controls. Therefore these data suggest that physical activity might impair immune capacity. AS

475 Wachnik (A). The physiological role of copper and the problems of copper nutritional deficiency. Nahrung 32(8); 1988; 755-765

The paper deals with recent achievement concerning the physiological role of Cu in the human organism. The problem of Cu supplementation of the human diet is discussed. An outlook is given on the contemporary theories referring to the role of Cu in nutrition. Special attention has been paid to the Cu containing enzymes and copper-dependent enzymes as well as to the problem of nutritional Cu deficiencies. This paper shows the necessity of copper for: "cleaning" of the organism from the excesses of free radicals, biogenic amines and cholesterol, the proper synthesis of hemoglobin, elastin, collagen and probably thyroid hormones, providing the energy formed in the respiratory chain and needed for biochemical syntheses and proper physical activity. AS

TOXICOLOGY

476 Grischott Oppici(F)Fortini (G). Use of respirometric curves for determining toxicity thresholds in effluent biological-treatment plants. Industria Conserve 64(1): 1989; 42-45 (It).

A 30-min toxicity test for waste waters to be biologically purified, based on decrease in the respiration rate of activated sludges due to the presence of toxic substance, was studied. The respiration rate was measured with an Oxygen Uptake Rate (OUR) instrument. The continuous measurement of specific OUR could prevent inhibition phenomena due to massive toxic wastes in biological-treatment plants. AS

477 Lewerenz (H-J), Plass (R), Bleyl (DWR) and Macholz (R). Short-term toxicity study of allyl isothiocyanate in rats. Nahrung 32(8); 1988; 723-728

Allyl isothiocyanate (AITC) was given in doses of 0, 10, 20 or 40 mg/kg (5 days/week) by oral intubation to male rats for up to 6 wks. The highest dosage level caused a decrease in body wt., thymus wt., blood glucose and serum globulin levels. Haematological examination revealed an increased percentage of neutrophils and a decreased percentage of lymphocytes after treatment for 2 wks. Increased live and adrenal wt. were found in all test groups. Renal dysfunction was indicated by increased urinary aspartate amino transferase activity, reduced urine vol. and changes in the sp. gr. of the urine. Histopathological changes were observed in the kidneys of animals at dosages of 20 and 40 mg/kg and in the livers of animals at the highest dosage level. AS

Mycotoxins

Aflatoxins

478 Candlish (AAG), Haynes (CA) and Stimson (WH). Detection and determination of aflatoxins using affinity chromatography. International Journal of Food Science and Technology 23(5); 1988; 479-485

Aflatoxins B1, B2, G1 and G2 can be easily and rapidly detected in aqueous solutions using an affinity chromatography column coupled to a monoclonal antibody specific for the toxin molecules. The two techniques are compared and discussed. This system can be used to test for aflatoxins in contaminated samples by spot testing (> 5 mg) or as a means of HPLC clean-up for quantitative analysis at subnanogram levels. The advantages of this immunological assay in relation to their immunoassays and traditional methods are discussed. SRA

479 Thanaboripat (D). Aflatoxin in spores of Aspergillus flavus. ASEAN Food Journal 4(2); 1988; 71-72

FOOD LAWS AND REGULATIONS

480 Otwell (SW). Regulatory status of aquacultured products. Food Technology 43(11); 1989; 103-105

This article discusses the regulatory aspects of cultured seafoods with particular attention directed toward product quality and safety concerns. 17 references. SRA

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GENERAL

481 Chadha (DS). Role of standardization of food in the growth of food industry. Beverage & Food World 16(1); 1989; 25-26

Discusses briefly the processed food industry, need for standardization in food industry, (role of BIS in regulating the quality of food, prevention of food adulteration (PFA) act), agmark and other regulations. SRA

482 Lewerenz (G). Stability and changeability of food habits. Nahrung 33(1); 1989; 17-23 (De).

Theoretic reflections were made about the relation between turning points in individual life and habits. Interviews of 439 people indicate a flexible-exploratory attitude of young adults concerning problems of nutrition, while food habits become more stable with increasing age. AS

483 Malkki (Y). Research needs and priorities in food technology. Lebensmittel-Wissenschaft und-Technologie 21(2); 1988; 71-75

A review based on interviews with research administrators and scientists and published research programmes from Europe, North America, Asia and Australia is presented and it restricts itself to the R & D needs of the industrialized countries. SRA

484 Prescott (A). What's the harm in aluminium. New Scientist 121(1648); 1989; 58-62

This article discusses effect of daily use of aluminium and aluminium vessels on our bodies. BV

485 Raeuber (H-J). Development of the food production by key technologies. Lebensmittelindustrie 35(4); 1988; 147-149 (De).

486 Rao (MV). Market potential for fresh and processed horticultural produce in 2001. Beverage & Food World 16(1); 1989; 13-16

A keynote address, covering research infrastructure, horticultural crop scenario, geographical distribution of crops, packaging material, and export quality. SRA

487 Venkataraman (S). Qualitative and quantitative requirements of fruits and vegetables by the processing industries. Beverage & Food World 16(1); 1989; 17-18

Article briefly reviews the current status, examine the scope and identify the future requirements and suggest some means of meeting the future needs of the industry. SRA

FOOD PROCESSING

488 Busch-Petersen (U) and Grieger (U). The economic valuation of processes. Lebensmittelindustrie 35(4); 1988; 154-156 (De).

Based on the valuation of the enterprise analysis, the economic valuation of processes is introduced as developed method of the analysis work. This article describes the targets, the result and the subject of the economic valuation of processes. This article deals with the criterions of valuation and the methods of their synthesis. AS

489 Simpson (R), Aris (I) and Antonio Torres (J). Sterilization of conduction-heated foods in oval-shaped containers. Journal of Food Science 54(5); 1989; 1327-1331, 1363

A finite difference approx. of the differential equation for transient heat conduction in three dimensions was used to evaluate thermal processes for foods in oval-shaped containers. A sensitivity analysis on the basis of thiamin retention was used to select the time increment and the size of the vol. elements required by the numerical method. Estimations of the temp. for the center of the oval container were in close agreement with an analytical solution valid for sufficiently long times, constant boundary conditions, and uniform initial temp. To validate the model, published experimental data for the retention of thiamin, chlorophyll and betanin were compared with values predicted by the numerical method. AS

FOOD PACKAGING

490 Anon. A fresh approach to produce packaging. Food Manufacture 64(9); 1989; 31, 33, 35-36

A review of the latest systems and materials for packaging fruit and vegetables. Covers utilising respiration, computerised information, permeable films, irradiation, and environment. 3 references. SRA

491 Sharma (BM). Packaging industry in India. Developments and dimensions. Packaging India 21(1); 1988; 5-8

Covers economic scene, loss minimisation, commodities packaging linkage, packaging industry, packaging trends and growth during 1980-84 (metal containers) and application of tinplate containers (small containers, large size cans). SRA

92 Testin (RF). The use of controlled atmosphere packaging for extending shelf-life of fruits, vegetables, and other fresh products. Packaging

India 21(1); 1989; 17-20

Packaging materials

493 Srivastava (MK) and Chopra (S). Impact of cobb value on the quality of corrugated boxes used for butter and ghee. Packaging India 21(1); 1988; 15-16

Discusses briefly material test performed, Cobb test, and packaging importance of testing (product-nature, storage size and transportability). SRA

FOOD ENGINEERING AND EQUIPMENT

Engineering

494 Ramaswamy (HS), Van de Voort (FR) and Ghazala (S). An analysis of TDT and Arrhenius methods for handling process and kinetic data. Journal of Food Science 54(5); 1989; 1322-1326

Thermal process calculations generally involve first order reaction kinetics which have been commonly described by the thermal death time (TDT) method in the field of food science but would normally be evaluated by the more conventional Arrhenius approach in most other fields. The relationship between these two irreconcilable approaches is examined conceptually and mathematically in terms of temp. dependence and their use for process time predictions. The errors associated with interconversion of E_a and z were shown to be functions of both selected reference temp. and the temp. range used. Good conversions of literature data with min. error were obtained by substituting the limits of the experimental range over which kinetic data were obtained for T_{min} and T_{max} in the relationship: E 2.303/T_{min} T_{max}. Although there is no perfect solution to these two conceptually different approaches to handling kinetic data and no proof as to which one is better, the approach of using the experimental temp. range limits produces good results. AS

Equipments

495 Dorfer (G), Gutjahr (J) and Trenkler (G). Continuously working, dosing and moistening device for extrusion plants. Lebensmittelindustrie 35(4); 1988; 162-163 (De).

The VEB Institut fur Getreideverabeitung have developed a dosing and mositening device for wetting of flour and semolina in the extrusion technology. Because of its high level of automation and of the improvement of the moistening quality it is an alternative of the application of customary mixing plants. The device has been tested in an extruder for semolina extrusion in continuous operation. It has proved its serviceability. AS

Cookers

496 Rama Rao (MB). Solar cookers and the implications of their use. Invention Intelligence 23(11); 1988; 379-381

Design of a new solar cooker suitable for small families and especially for cooking the evening meal is described. BV

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

Chemistry

497 Chen (CS). Water activity-concentration models for solutions of sugars, salts and acids. Journal of Food Science 54(5); 1989; 1318-1321

A semi-empirical model of water activity changes due to solute concn. increase in solutions of electrolytes and non-electrolytes was developed based on an extension of Raoult's law. Comparisons between predicted and observed water activity data for a var. of sugars, salts and acids indicated the proposed model fitted the water activity data with accuracy to plus or minus 0.001 water activity up to 4-14 molalities depending upon the solutes. Per cent wt. concn. of some solutes for various water activity values at 25 C were presented for practical applications. AS

498 Djelveh (G), Petit (M) and Gros (JB). Influence of sodium chloride concentration, potassium nitrate and temperature on the apparent diffusion coefficient of chloride ions through agar gels. Lebensmittel-Wissenschaft und-Technologie 21(2); 1988; 103-107

A diffusion cell and a new mathematical model have been used to study the apparent diffusion coeff. of Cl^{-1} through 3% agar gels. For 5 kg/m^3 sodium chloride concn. solution the apparent diffusion coeff. was obtained within less than 110 min (D 1.50 x 10^{-9} m^2 s, sp 0.01 x 10^{-9} m^2 s). The influence of salt concn. on the apparent diffusion coeff. was simulated satisfactorily by the Robinson and Stokes model. The presence of potassium nitrate increased the diffusion coeff. of Cl^{-1} . The influence of temp. can be adequately explained by an Arrhenius-type law with an activation energy of 19.1 kJ/mole. AS

499 Gross (R), Koch (F), Malaga (I), De Miranda (AF), Schoeneberger (H) and Trugo (LC). Chemical composition and protein quality of some local Andean food sources. Food Chemistry 34(1); 1989; 25-34

The chemical comp. of tubers of Tropaeolum tuberosum, Oxalis tuberosa, Iliacus tuberosum and the seeds of Chenopodium quinua, Chenopodium padilicaule, Amaranthus caudatus and Lupinus mutabilis was studied. The protein efficiency ratios (PER) of quinua, amaranth and lupin were also investigated. The results show that the native Andean tubers constitute sources of highly digestible carbohydrates, whereas the cereal-like grains are characterized by a protein content higher than that found in cereals, and an excellent protein quality. The Andean lupin possesses the advantage of an extremely high protein and energy density, although protein quality is low; this advantage, however, can be overcome by mixing with other traditional Andean food crops. It can be concluded that diets based on well-combined local food sources constitute an inexpensive, ecologically useful and physiologically adequate contribution to combat widespread malnutrition in the Andean area. AS

500 Kroh (L), Zeise (S), Westphal (G) and Macholz (R). Investigations on the Maillard reaction. Part 17. Inhibition of the Maillard reaction by sulphur compounds. Nahrung 33(1); 1989; 51-55 (De).

Investigations into the model system D-glucose/glycine have shown that thiol compounds such as L-cysteine are able to inhibit non-enzymatic browning reactions as in the case of Maillard reaction. The "rate of inhibition" (I_R) depends on the pH level and the ionic strength and is influenced by nature and concn of the inhibitor. AS

Chemistry(Analytical)

501 Fung (Y-S) and Luk (S-F). Determination of salicylic acid in pharmaceutical formulations and foods by differential-pulse voltammetry using a glassy carbon electrode. Analyst 114(8); 1989; 943-945

A simple and rapid voltammetric method for the detn. of salicylic acid in pharmaceutical preparations and foods has been developed. The sample was extracted using either diethyl ether or ethanol-diethyl ether and then back-extracted into 0.015 mM disodium hydrogen phosphate solution. The peak current was measured using a glassy carbon electrode at 0.85 V. The working range was 0-25 p.p.m. The average recovery for ointment was 99% with a standard deviation of 5.0%. Results are reported for eight different pharmaceutical formulations. AS

502 Hamano (T), Mitsuhashi (Y), Aci (N), Yamamoto (S), Tsuji (S) and Ito (Y). High-performance liquid chromatographic assay of chondroitin sulphate in food products. Analyst 114(8); 1989; 891-893

A high-performance liquid chromatographic method for the detn. of chondroitin sulphate (ChS) in foods is described based on the detection of two unsaturated disaccharides liberated from ChS by enzymatic digestion with chondroitinase ABC. Chondroitinase ABC hydrolyses ChS to produce two unsaturated disaccharides (6-sulphonated and 4-sulphonated disaccharides). Which were retained on an amino-phase column with retention times of 6.2 and 7.3 min, resp.

The peaks resulting from these disaccharides were used to determine the amount of ChS in the sample. The method was applied successfully to the analysis of commercial mayonnaise, dressing and fish sausage. AS

503 Kocsanyi (L), Richter (P), Nagel (E) and Buschmann (C). The application of photoacoustic spectroscopy in food investigation. Acta Alimentaria 17(3); 1988; 227-237

The new sensing technique "photoacoustics" (PA) has some advantages over the conventional optical spectroscopic detection methods. It permits simple sample pretreatment and it is independent of the opaqueness and scattering of the sample. Finally it permits depth profiling of the sample. First, principles of photoacoustic spectroscopic (PAS) measurement technique is summarized. To show its applicability for investigation of food samples photoacoustic spectra of paprika powder and fresh paprika were measured and evaluated including depth profile measurements on the fresh sample. In order to support practical applicability of the technique a new simple contact probe was developed that permits measurement to be carried out without any sample pretreatment. PA spectra of paprika and carbon powder were measured both with a conventional gas-microphone cell and the new contact probe. AS

504 Mucke (W), Voigt (K) and Benz (J). Early detection of environmental chemicals in food by means of specific substance criteria. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 189(2); 1989; 99-102 (De).

In an approach to selecting potential food contaminants by means of specific substance criteria we came up with a list of 68 chemicals. Among them, we found chemicals which are already well known as food contaminants such as polycyclic aromatic hydrocarbons and chloroaromatic compounds. So far, other chemicals have not been mentioned as food contaminants. During a project called "Information System for Environmental Chemicals" we conducted, for these 68 chemicals, an intensive literature search in databases for their occurrence in food. The results are stored in our factual databank named "LEBKON" and are graphically described in profiles. For 44 of the chemicals, we found information for their detection in food or in drinking water. We plan to analyse the remaining substances for which no data have been found in the literature. We placed emphasis on the toxicological properties and of production vol. of the substances in question. This approach should represent a contribution to the question of monitoring systems oriented by the consumer and monitoring systems oriented by cause. AS

505 Pelegri (R), Beltrain (V), Coscolla (R) and Cunat (P). Determination of ethylenethiourea residues as an index of ethylenebisdithiocarbamate contamination in agricultural products. Revista de Agroquimica y Tecnologia de Alimentos 28(3); 1988; 415-420 (Es).

The dissipation curve of ethylenethiourea (ETU) in several vegetables (lettuce, tomatoes and red peppers) treated with mancozeb has been studied in order to know if the detn. of ethylenethiourea can be used as an indicator of residual contents in treated agricultural products. Results show that ETU detn. is a good indicator of the ethylene bisdithiocarbamates presence and of their dissipation in vegetables. AS

506 Reynolds (SL), Scotter (MJ) and Wood (R). Determination of synthetic colouring matter in foodstuffs-collaborative trial. Part I. Initial trail. Journal of the Association of Public Analysts 26(1); 1988; 7-25

A collaborative trial by twelve U.K. Public Analyst and Government lab. and one Danish Government lab. to assess the suitability of a method of analysis for the detn. of synthetic colouring materials (dyes) in foodstuffs has been carried out. Six samples of soft drinks and two samples of sponge cake spiked with a range of dyes were used. From the statistical analysis of the trial data, it was found that the method produced variable results with respect to repeatability and reproducibility, notably for samples known to contain several different dyes and those samples containing dyes known to be unstable during extraction. There were also several instances of dye mis-identification. AS

507 Schwendig (P) and Thier (H-P). Identification and quantitation of methyl-cellulose amongst other thickeners in foods. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 188(1); 1989; 1-6 (De).

An analytical method is described for the isolation, identification and quantitative detn. of methyl-cellulose in foods. First, natural thickeners and gums are precipitated with ethanol and can be analysed subsequently in a separate way. Depending on the comp. of the food commodity in question, proteins, fats, and residual starch are removed and methyl-cellulose is isolated by precipitation with tannic acid or by gel permeation chromatography. Hydrolysis with hydrochloric acid is followed by separation of the methylglucose formed by glass capillary gas chromatography as trimethylsilyloximes. From the sum of the components, the methylcellulose content and the degree of methylation can be calculated. The limit of detn. in fortified samples was about 0.02 g/100 g for dairy products and as low as 0.005 g/100 g for fruit products, wine and beer (recoveries 50% - 80%). AS

FOOD MICROBIOLOGY AND HYGIENE

Enzymes

508 Fadda (MB), Dessi (MR), Rinald (A) and Satta (G). Sandy alumina as substrate for economic and highly efficient immobilization of beta-glucosidase. Biotechnology and Bioengineering 33(6); 1989; 777-779

Beta-glucosidase from Trichoderma viride was immobilized without substantial loss of activity, by absorption on sandy alumina, a solid support which is much cheaper than supports previously used. This support has a high capacity for the enzyme and does not absorb the reaction product. Alumina support for beta-glucosidase was simple, shift and economically competetive process. GAR

Fermented foods

509 Afolabi (OA), Oyewo (EA), Torimiro (SEA), Osuntugun (BA), Ogundaini (AO) and Talabi (SO). Chemical and toxicological evaluation of extracts of fermented red acalypha (Acalypha wilkesiana). A suggested tea adjunct. Food Sciences and Nutrition 42F(2); 1989; 133-139

Due to a short supply of tea in Nigeria, fermented red acalypha has been proposed as a tea adjunct because of the resemblance between the colour of tea and its water extract. The leaf extract has medicinal properties and is active against a broad spectrum of microorganisms. The present study is designed to screen the extract for the classes of compounds present and evaluate the toxicological implications of uncontrolled consumption of its water extract. Phytochemical screening of the fermented dried leaves of A. wilkesiana revealed the presence of alkaloids, tannins, anthroquinones and glycosides. Saponins were absent. The water extract contained more tannin (20.0 mg/g catechin equivalent) and polyphenols (37.5 mg/g tannic acid equivalent) than the methanol extract (6.6 mg/g catechin equivalent for tannins and 30.0 mg/g tannic acid equivalent for polyphenols). Using a hot water extract of the leaves as the only source of liquid for albino mice for 35 days revealed degenerative changes in the liver and kidney of the test animals. AS

Microorganisms

Algae

510 Ha (YW), Thomas (RL), Dyck (LA) and Kunkel (ME). Calcium binding of two microalgal polysaccharides and selected industrial hydrocolloids. Journal of Food Science 54(5); 1989; 1336-1340

Binding of Ca ions to polysaccharides from two freshwater microalgae, Palmella texensis (UTEX 1708) and Cosmarium turpinii (UTEX LB 1042) (PTP and CTP, resp.), and six industrial hydrocolloids was studied. The amount of bound Ca decreased with a decrease in pH below 6. Scatchard analysis showed that PTP, guar and locust bean had low Ca affinity and one type of binding site. Alginate bound Ca with the greatest affinity (K 1.31 x 10^6) among the hydrocolloids examined and appeared to have one type of binding sites. The order of magnitude of uronic acid in each hydrocolloid did not agree with the order of Ca binding affinity as an intrinsic association constant indicating limited importance of the chemical nature of hydrocolloids to the effect of linear charge density. AS

Bacteria

511 Jakob (R), Lippert (S) and Baumgart (J). Automated turbidimetry for the rapid differentiation and enumeration of bacteria in food. Zeit-

schrift fur Lebensmittel-Untersuchung und -Forschung 189(2); 1989; 147-148

A fully automated analysis system has been used to determine bacterial contamination in food, both qualitatively and quantitatively. Growth curves of bacterial flora were monitored using differential media, and a correlation was established between growth curve parameters and colony-forming units derived from drop-plating as the reference method. Optimal correlation was reached by multiple linear regression. The results were already obtained 16 h. AS

512 Patel (P). Diagnostic tests for particular bacteria and bacterial toxins. Food Manufacture 64(9); 1989; 69, 71, 73-74

The latest advances in fast diagnostics are reviewed. Covers analysis of bacteria, latex agglutination tests, performance characteristics, Listeria and other bacteria, analysis of bacterial toxins and future trends. 11 references. SRA

Aeromonas hydrophila

513 Leung (K-Y) and Stevenson (RMW). Characteristics and distribution of extracellular proteases from Aeromonas hydrophila. Journal of General Microbiology 134(1); 1988; 151-160

The major extracellular proteases of Aeromonas hydrophila NRC 505 and ATCC 7966 are a thermostable metallo-protease (TSMP) and a thermolabile serine-protease (TLSP), resp. The purified enzymes differed in sensitivity to heating at 56 C for 30 min, in response to the inhibitors EDTA and phenylmethylsulphonyl fluoride (PMSF), and were antigenically distinct. When crude extracellular products (ECP) of 47 strains of A. hydrophila were screened, 27 strains produced both TSMP and TLMP. TSMP was the only extracellular protease produced by 19 strains, whereas only A. hydrophila ATCC 7966 produced TLSP as its sole protease. This distribution of protease enzymes among strains explains conflicting reports from studies in which single strains of A. hydrophila were examined. The TLSP of A. hydrophila was similar to the protease of A. salmonicida. Either or both TSMP and TLSP were produced by some strains of A. sobria and A. caviae. AS

Bacillus

514 Takami (H), Akiba (T) and Horikoshi (K). Production of extremely thermostable alkaline protease from Bacillus sp. No. AH 101. Applied Microbiology and Biotechnology 30(2); 1989; 120-124

An alkalophilic Bacillus sp. No. AH-101, which produced extremely thermostable alkaline protease, was isolated among 200 soil samples. The enzyme production reached its max. level of 1500 units/ml after about 24 h in alkaline medium (pH 9.5). The enzyme was a most active toward casein at pH 12-13 and stable to 10 min incubation at 60 C from pH 5-13. Calcium ions were effective in stabilizing the enzyme especially at higher temp. The optimum and stable temp. were about 80 C and below about 70 C resp. in the presence of 5 mM calcium ions. The enzyme was completely inactivated by phenylmethane sulphonyl fluoride, but little affected by ethylenediaminetetraacetic acid, urea, sodium dodecylbenzenesulphonate and sodium dodecyl sulphate. The mol. wt. and sedimentation constant were approx. 30000 and 3.0S resp., and the isoelectric point was at pH 9.2. These results indicate that No. AH-101 alkaline protease is more stable against both temp. and highly alkaline conditions than any other protease so far reported. AS

Bacillus cladolyticus

515 Cheng (CY), Yabe (I) and Toda (K). Selective growth of a mutant in continuous culture of Bacillus cladolyticus for production of alpha-amylase. Applied Microbiology and Biotechnology 30(2); 1989; 125-129

In a continuous culture of Bacillus caldolyticus strain SP, which requires maltose as an inducer for production of alpha-amylase in batch culture, a predominant mutant strain M1 which produced high amounts of alpha-amylase in the absence of maltose in batch culture, developed. The changes of cell population from strain SP to strain M1 in maltose-casitone medium was linear with time in the transient state after the change from batch to continuous culture at a dilution rate of 0.17 h^{-1}, and was completed in about 11 generations of bacterial growth. The dilution rate effect of continuous culture of alpha-amylase activity was almost the same with both strains SP and M1. The max. alpha-amylase activity of 380 units/ml was observed at an intermediate dilution rate that was 11.5 times higher than alpha-amylase activity at the end of a batch culture using the same medium. It was deduced that the enhancement of alpha-amylase production in continuous culture was attributed partly to the predominant growth of mutant strain with higher alpha-amylase productivity. AS

Bacillus stearothermophilus

516 Beaman (TC), Pankratz (HS) and Gerhardt (P). Heat shock affects permeability and resistance of Bacillus stearothermophilus spores. Applied and Environmental Microbiology 54(10); 1988; 2515-2520

Heat shock of dormant spores of Bacillus stearothermophilus ATCC 7953 at 100 or 80 C for short times, the so-called activation or breaking of dormancy, was investigated by separating the resulting spores by buoyant density centrifugation into a band at 1.240 g/ml that was distinct from another band at 1.340 g/ml, the same density as the original spores. The proportion of spores at 1.240 g/ml became larger when the original dormant spores were heated for a longer period of time, but integument-stripped dormant spores were quickly and completely converted to spores with a band at 1.240 g/ml. The spores with bands at both 1.240 and 1.340 g/ml were germinable faster than the original dormant spores and thus were considered to be activated. The spores with a band at 1.240 g/ml, which were considered to be fully activated, were apparently permeabilized, with a resulting complete depletion of dipicolinic acid, partial depletion of minerals, susceptibility to lysozyme action, permeation of the gradient medium, changed structural appearance in electron micrographs of thin-sectioned spores, and partly decreased heat resistance (D_{100} = 453 min) compared with the original dormant spores (D_{100} = 760 min). However, the fully activated spores with a band at 1.240 g.ml, although devoid of dipicolinic acid, still were much more resistant than germinated spores or vegetative cells (D_{100} = 0.1 min). The spores with a band at 1.340 g/ml, which were considered to be partly activated, show no evidence of permeabilization and were much more heat resistant (D_{100} = 1, 960 min) than the original dormant spores. This phenomenon of super-resistance may involve either in situ induction or selection of a preexisting subpopulation. AS

Bacillus subtilis

Fang (A) and Demain (AL). A new chemically-defined medium for RAC-certified and other strains of Bacillus subtilis. Applied Microbiology and Biotechnology 30(2); 1989; 144-147

Conventional chemically-defined media were found to be inadequate for extensive batch culture growth of an asporogenous mutant of Bacillus subtilis certified as an HV-1 host for recombinant DNA. We developed a chemically defined medium for rapid and extensive growth of one such strain, BGSC-1853. The medium contains no components requiring separate sterilization. It is also useful for the prototrophic 168 strain (from which 1853 was derived), a triple auxotroph of 168, and a highly debilitated (HV-2) 168 strain (BGSC 1876) upon addition of the specific growth factors required by these strains. Excellent growth was also obtained with W-23, a Bacillus subtilis strain unrelated to the 168 series. AS

Escherichia coli

Todd (ECD), Szabo (RA), Peterkin (P), Sharpe (AN), Parrington (L), Bundle (D), Gidney (M AJ) and Perry (MB). Rapid hydrophobic grid membrane filter-enzyme-labeled antibody procedure for identification and enumeration of Escherichia coli 0157 in foods. Applied and Environmental Microbiology 54(10); 1988; 2536-2540

An O-antigen-specific monoclonal antibody, labeled by horseradish peroxidase-protein A, was used in a hydrophobic grid membrane filter-enzyme-labeled antibody method for rapid detection of Escherichia coli 0157 in foods. The method yielded presumptive identification within 24 h and recovered, on average, 95% of E. coli 0157:H7 artificially inoculated into comminuted beef, veal, pork, chicken giblet, and chicken carcass washings. In food samples from two outbreaks involving E. coli 0157:H7, the organism was isolated at levels of up to 10^3 g. The lower limit of sensitivity was 10 E. coli 0157/g of meat. Specific typing for E. coli 0157:H7 can be achieved through staining with labeled H7 antiserum or tube agglutination. AS

Staphylococcus

519 Fujikawa (H) and Igarashi (H). Rapid latex agglutination test for detection of Staphylococcal enterotoxins A to E that uses high-density latex particles. Applied and Environmental Microbiology 54(10); 1988; 2345-2348

A rapid reversed passive latex agglutination method that uses high-density latex particles for the detection of Staphylococcal enterotoxins (SE) A to E was developed. It took 3 h for incubation, much less than the 16 h needed with a customary latex agglutination test for SE detection such as a commercial test kit (SET-RPLA; Denka Seiken Co. Ltd., Tokyo, Japan). The rapid test was shown to be highly specific and sensitive for SE detection (detection limit, about 0.5 Ng of SE per ml), comparable to the SET-RPLA test. The rapid test was also efficient in SE detection in foods and culture supernatants of staphylococcal strains, similar to the SET-RPLA test. This showed that a rapid test with high-density latex particles is fully reliable for use. AS

Staphylococcus aureus

520 Ohtomo (T), Yamada (T) and Yoshida (K). Outermost-cell-surface changes in an encapsulated strain of Staphylococcus aureus after preservation by freeze-drying. Applied and Environmental Microbiology 54(10); 1988; 2486-2491

The effects of drying time during freeze-drying on the outermost cell surface of an encapsulated strain of Staphylococcus aureus S-7 (Smith, diffuse) were investigated, with special attention paid to capsule and slime production. To quantify capsule and slime production, capsule antigen production and cellular characteristics such as growth type in serum-soft agar, cell vol. index, and clumping factor reaction were examined. After freeze-drying the colonial morphology of strain S-7 was altered from a diffuse to a compact type in serum-soft agar. In accordance with these changes, the titer of the clumping factor reaction increased while the cell vol index, capsule and slime production, and capsule antigen production were markedly decreased in parallel with the period of freeze-drying. The ability of strain to adhere to collagen, fibrinogen, and soybean lectin was also compared before and after freeze-drying. Fibrinogen levels slightly increased when 10% skim milk and 2% honey were used as cryoprotective agents and showed a remarkable increase when 0.05 M phosphate buffer was used as a control. Also, the ability of strain S-7 to adhere to soybean lectin declined, whereas no changes were observed for collagen under any conditions. Strain S-7 was phage nontypable before freeze-drying but the number of typable cells increased after freeze-drying; phage-typable cells reacted to phage 52 alone after 5 h of freeze-drying, but additional cells also proved to be phage typable to phage 42E after 10 h. Electron micrographs indicated that strain S-7, an encapsulated strain, was converted to an unencapsulated state after freeze-drying. Results of our study indicate that the freeze-drying process inhibits capsule and slime production in S. aureus, which consequently brings about changes in the outermost cell surface. AS

Streptococcus cremoris

521 Boquien (C-Y), Corrieu (G) and Desmazeaud (MJ). Effect of fermentation conditions on growth of Streptococcus cremoris AM2 and Leuconostoc lactis CNRZ 1091 in pure and mixed cultures. Applied and Environmental Microbiology 54(10); 1988; 2527-2531

Two strains of mesophilic lactic acid bacteria Streptococcus cremoris AM2 and Leuconostoc lactis CNRZ 1091, were grown in pure and mixed cultures in the presence or absence of citrate (15 mM) and at controlled (pH 6.5) or uncontrolled pH. Microbial cell densities at the end of growth, max. growth rates, the pH decrease of the medium resulting from growth, and the corresponding acidification rates were determined to establish comparisons. The control of pH in pure cultures had no effect on L. lactis CNRZ 1091 populations. The final populations of S. cremoris AM2 , however, were at least five times higher than when the pH was not controlled (4 x 10^{8} vs. 2 x 10^{9} cfu. Ml^{-1}). The pH had no effect on the growth rate of either strain. That of S. cremoris AM2 (0.8h^{-1}) was about twice that of L. lactis CNRZ 1091. When the pH fell below 5, the growth of both strains decreased or stopped altogether. Citrate had no effect on S. cremoris AM2, while final population of L. lactis CNRZ 1091 were two to three times higher (3 x 10^{8} cfu. ml^{-1}); it had no effect on the max. growth rates of the two strains. Citrate attenuated the pH decrease of the medium and reduced the max. acidification rate of the culture by 50%, due to the growth of S. cremoris AM2. Acidification due to L. lactis CNRZ 1091, however, was very slight. Regardless of the conditions of pH and citrate, the total bacterial population in mixed culture was lower(by 39%) than that of the sum of each pure culture. Mixed culture improved the max. growth rate of L. lactis CNRZ 1091 (0.6 h^{-1}) by 50%, while that of S. cremoris AM2 was affected. The acidification rate of the growth medium in mixed culture, affected by the presence of citrate, resulted from the development and activity of S. cremoris AM2. AS

Streptococcus mutans

522 Kurita (T) and Hirasawa (M). Biological and biochemical characterization of novel lipid-like antibacterial substances (Mutalipocins) produced by Streptococcus mutans strain 32 K. Journal of General Microbiology 134(1); 1988; 213-220

Two novel antibacterial substance (designated mutalipocins) have been isolated from the culture supernatant of Streptococcus mutans strain 32 K were purified by extraction of the culture supernatant with light petroleum (b.p. range 30-60 C) followed by Lobar column chromatography on Lichroprep RP-8 HPLC indicated that both mutalipocin preparations (ML-I and ML-II) were homogeneous. The M_t value of ML-I and ML-II were less than 1000. Both mutalipocins were unaffected by treatment over the pH range 3.0-10.0, or with phospholipase A or proteolytic enzymes, but were partially inactivated by treatment with lipase or phospholipase C. ML-II was resistant to heat treatment. TLC indicated that ML-I and ML-II contained unsaturated, aldehyde and/or ketone, and ester groups. The inhibition of S. mutans ML-I and ML-II was due to bactericidal, rather than bacteriostatic activities. The antibacterial spectra of ML-I and ML-II were narrower and more sp. specific than those of bacteriocins produced by other gram-positive bacteria. AS

Fungi

Aspergillus flavus

523 Peleg (Y), Barak (A), Scrutton (MC) and Goldberg (I). Malic acid accumulation by Aspergillus flavus. Applied Microbiology and Biotechnology 30(2); 1989; 176-183

^{13}C Nuclear magnetic resonance and fumarase and NAD-malate dehydrogenase isoenzyme studied were carried out in a strain of A. flavus which produces relatively high levels of L-malic acid from glucose. The results of the ^{13}C NMR showed that the ^{13}C label from (1- ^{13}C) glucose was incorporated only to C-3 ($-CH_2-$) of L-malic acid and indicated that this acid must be synthesized from pyruvate mainly via oxaloacetate. Electrophoretic analysis has established the presence of unique mitochondrial and cytosolic isoenzymes for fumarase and malate dehydrogenase. Changes in the isoenzyme pattern were observed for malate dehydrogenase but not for fumarase during acid production. Cycloheximide inhibited profoundly both L-malic acid production and the increase in the major isoenzyme of malate dehydrogenase, without affecting either the total activity of fumarase or its isoenzyme pattern. The results suggested that de novo protein synthesis is involved in the increase in the activity of the major isoenzyme of malate dehydrogenase and that this isoenzyme is essential for L-malic acid production and accumulation. AS

Aspergillus niger

524 Lee (YH), Lee (CW) and Chang (HN). Citric acid production by Aspergillus niger immobilized on polyurethane foam. Applied Microbiology and Biotechnology 30(2); 1989; 141-143

Citric acid was produced using Aspergillus niger immobilized on polyurethane foam in a bubble column reactor. Most of the absorbed cells remained on the support and, as a result, high oxygen tension was maintained during the reactor operation. However, uncontrolled growth of the pellets made continuous reactor operation difficult. The citric acid productivity obtained from 15 vol.% foam particles containing immobilized cells was 0.135 g/l per hr. This productivity of immobilized cells was almost the same as that of free cells. The oxygen level dropped to half saturation in 5 days in the immobilzed cell culture in contrast to 2 days in the free cell culture. AS

525 Markwell (J), Frakes (LG), Brott (EC) and Osterlman (J). Aspergillus niger mutants with increased glucose oxidase production. Applied Microbiology and Biotechnology 30(2); 1989; 166-169

Aspergillus niger NRRL-3, an organism used for the industrial scale production of D-gluconic acid and glucose oxidase (EC 1.1.3.4), was subjected to mutagenesis and selection for acid production on diagnostic media containing methyl red. The plates contained 0.1 M D-glucose, a concn. that does not produce a colour change in the medium surrounding mycelia of the parental strain under the conditions empolyed. Mutagenized spores yielded occasional colonies which were able to grow rapidly and were surrounded by a reddish zone. A number of such presumptive mutants were selected and isolated. Twenty-six such strains were grown in shaken cultures with liquid media containing 0.01, 0.1 or 0.5 M D-glucose, harvested, disrupted and the specific activity of D-glucose oxidase determined. Seven of the mutant strains had glucose oxidase specific activities markedly higher than the parental strain. AS

Mushrooms

526 Moore (BM) and Flurkey (WH). Tyrosinase activities and isoenzymes in three strains of mushrooms. Journal of Food Science 54(5); 1989; 1377-1378

Tyrosinase activities and isoenzymes were examined in three strains of mushrooms. Using L-dopa as a substrate, the M9 strain contained more active and latent enzyme than M2 or M8 strains. Each strain showed a characteristic isoenzyme profile after electrophoresis. The M8 strain contained at least four isoenzyme forms while M2 and M9 strains contained fewer than three forms. In the M8 strain more tyrosinase was found in cap skin and flesh tissue than in stalk or gill tissue. Cap flesh also contained the greatest amount of latent enzyme. Each tissue showed a characteristic isoenzyme profile after electrophoresis. Tyrosine and dopa oxidation were associated with one isoenzyme form while another major form preferred dopa as substrate. AS

Penicillium funiculosum

527 Mala Rao and Chitra Mishra. Glucohydrolase from Penicillium funiculosum. Applied Microbiology and Biotechnology 30(2); 1989; 130-134

A 1,4-beta-D-glucan glucohydrolase (EC 3.2.1.74) was isolated from culture filtrates of Penicillium funiculosum and purified by isoelectric focussing. The purified enzyme was homogeneous as indicated by electrophoresis on sodium dodecyl sulphate-polyacrylamide gels. The enzyme had a mol. wt. of 20000 and the PI was 4.45. The hydrolysis of Avicel by the purified enzyme and culture broth using equal amounts of Walseth units were comparable. The glucohydrolase did not act in synergism with endoglucanase or cellobiohydrolase from the same culture. The enzyme had little ability to attack carboxymethyl cellulose. it showed activity towards Avicel, Walseth cellulose and cellooligosaccharides (G_3 $-G_5$), producing glucose as the end product, indicating that the enzyme is a beta-1-4 glucan glucohydrolase. The enzyme exhibited transglucosidase activity, producing higher oligosaccharides from cellobiose. AS

Rhizopus oligosporus

528 Nahas (E). Control of lipase production by Rhizopus oligosporus under various growth conditions. Journal of General Microbiology 134(1); 1988; 227-233

Some factors influencing the growth and production of extracellular lipase by Rhizopus oligosporus were studied. Highest yields of enzyme were obtained when Tweens were the carbon source. Soybean meal extract supported good growth and enzyme production. Carbohydrates, vegetable oils, proteins or amino acids did not stimulate lipase production. The fungus grew well with carbohydrate or protein-supplemented media but not with oils, unless emulsified with a non-metabolizable gum. The production of biomass in static cultures was max. at 35-40 C after 4 d at pH 5.5. The yield of lipase was max. at 25 C after 3 d at pH 6.5. Shaking cultures enhanced growth but decreased lipase production. AS

Yeasts

Brewer's yeast

529 Schulz (R) and Beubler (A). Targets and methods of the genetic manipulation of brewer's yeasts. Lebensmittelindustrie 35(4); 1988; 164-166 (De).

Based on the technological targets of the improvement of yeast strains that are applied in the brewing industry at present, the authors explain the known and upto-date methods of the tended change of hereditary information which come into question for such manipulation, before the background of the genetic status of these yeasts. They accentuate the importance of the selective transformation of genes, especially. AS

Saccharomyces bayanus

530 Nabais (RC), Sa-Correia (I), Viegas (CA) and Novais (JM). Influence of Ca ion on ethanol tolerance of Saccharomyces bayanus and alcoholic fermentation by yeasts. Applied and Environmental Microbiology 54(10); 1988; 2439-2446

The addition of Ca^{2+} (as CaCl) in optimal concn. (0.75 to 2.0 mM) to a fermentation medium with a trace contaminating concn. of Ca^{2+} (0.025 mM) led to the rapid production of higher concn. of ethanol by Saccharomyces cerevisiae, Saccharomyces bayanus, and Kluyveromyces marxianus. The positive effect of Ca supplementation (0.75 mM) on alcoholic fermentation by S. bayanus was explained by the increase in its ethanol tolerance. The ethanol inhibition of growth and fermentation followed the equation $MU_{xi} = MU_{oi} \quad [1-(X/X_{mi} \quad]^{n^i}$, where MU_{ci} and MU_{xi} are, resp. the specific growth (i=g) and fermentation (i=f) rates in the absence or presence of a concn. (X) of added ethanol, and X_{mi} is the maximal concn. of ethanol which allows growth or fermentation. The toxic power is given by n^i . In Ca^{2+}

supplemented medium (0.75 mm), n_g = 0.42 for growth and n_f = 0.43 for fermentation compared with 0.52 and 0.55, resp., in unsupplemented medium; for both media, X_{mg} = 10% (vol/vol) and X_{mf} = 13% (vol/vol). For lethal concn. of ethanol, the specific death rates were minimal for cells that were grown and incubated with ethanol in medium with an optimal concn. of Ca^{2+}, maximal for cells grown and incubated with ethanol in unsupplemented medium, and intermediate for cells grown in unsupplemented medium and incubated with ethanol in Ca-supplemented medium. The effect of Ca^{2+} on the acidification curve of energized cells in the presence of ethanol was found to be closely associated with its protective effect on growth, fermentation, and viability. AS

Saccharomyces cerevisiae

531 Gopal (CV), Broad (d) and Lloyd (D). Bioenergetic consequences of protein over expression in Saccharomyces cerevisiae. Applied Microbiology and Biotechnology 30(2); 1989; 160-165

Some bioenergetic consequence of overexpression of plasmid-encoded homologous (phosphoglycerate kinase), and heterologous (prochymosin), protein in S. cerevisiae strains grown in chemostat culture have been investigated. Both overexpressing strains were found to exhibit similar fermentation paterns despite a 10-fold difference in product expression levels. Biomass yields were lower than those for a control strain, and the onset of oxido-fermentative metabolism occurred at a lower dilution rate. A marked rise in cellular ATP content with increasing dilution rate during oxidative growth was observed in the strain overexpressing yeast phosphoglycerate kinase (PGK); this at present cannot be adequately explained. The inorganic phosphate content of the overexpressing strains was higher than that of the control and the phosphorylation potential of the prochymosin expressing strain was up to 10-fold lower than both the control and PGK overexpressing strains. It is proposed that expression of heterologus prochymosin imposes a greater energy drain on the host than overexpression of homologous PGK. This energetic drain may be limiting factor in heterologus gene expression. AS

Zymomonas mobilis

532 Schmidt (A), Bringer Meyer (S), Poralla (K) and Sahm (H). Influence of ethanol on the activites of 3-hydroxy-3 methyl glutaryl-coenzyme A reductase and squalene hopene-cyclase in Zymomonas mobilis. Applied Microbiology and Biotechnology 30(2); 1989; 170-175

The influence of different primary aliphatic alcohols on the activities of two key enzymes in hopanoid biosynthesis of Zymomonas mobilis was investigated. By use of ^{14}C - and ^{3}H- labelled substrates the enzyme 3-hydroxy-3-methylglutaryl-CoA-reductase and squalene-hopene cyclase were detected with activities of 1.6 pmol x $(\text{min x mg protein})^{-1}$ and 2.3 pmol x $(\text{min x mg protein})^{-1}$, resp. Cells grown in the presence of 6% (v/v) ethanol did not show higher activities of these enzymes than cells grown in the presence of 1%

(v/v) ethanol. Furthermore, 3-hydroxy-3-methylglutaryl-CoA-reductase was not activated by ethanol. However, ethanol activated the squalene-hopene-cyclase when added to the enzyme test system. Besides ethanol, propanol also had a positive effect on the squalene-hopene-cyclase: the enzyme's activity increased 1.7-fold in the presence of either alcohol at a concn. of 6% (v/v). This corresponded with a similar increase of hopanoid content of whole cells when grown in the presence of 6% (v/v) added ethanol or propanol. These results indicated that the squalene-hopene-cyclase has a regulatory function in the alcohol dependent hopanoid biosynthesis of Z. mobilis. AS

BIOTECHNOLOGY

533 Cadwallader (KR), Braddock (RJ), Parish (ME) and Higgins (DP). Bioconversion of (+) -limonene by Pseudomonas gladioli. Journal of Food Science 54(5); 1989; 1241-1245

Pseudomonas gladioli was isolated by an enrichment culture technique using limonene as the sole source of carbon. Fermentations were conducted for 4-10 days in shake flask at 25 C using a pH 6.5 mineral salts medium and 1.0% (+)-limonene. Major conversion products were identified as (+)-alpha-terpineol and (+)-perillic acid. Quantitative analysis of alpha-terpineol and perillic acid during the fermentation revealed that alpha-terpineol was resistant to further degradation by the bacterium, while perillic acid was readily degraded. AS

534 Godown (RD) and Samejima (H). The biotechnology race. A report. 39(9); 1988; 555-568

This report was presented at the 4th European Congress on Biotechnology 1987, held in Amsterdam from 14-19 June. Covers biotechnology in the United States, biotechnology in Japan, Development of Japanese fermentation technology and industries, access of Japanese government and private companies towards new biotechnology, pharmaceuticals, diagnostics, chemical products, foods, liquors and cosmetics fields, agricultural fields and future prospects of Japanese biotechnology. SRA

Single cell proteins

535 Sukara (E) and Doelle (HW). A one-step process for the production of single-cell protein and amyloglucosidase. Applied Microbiology and Biotechnology 30(2); 1989; 135-140

A new Rhizopus sp. was isolated from traditional Indonesian food, tempeh. The newly isolated sp. was similar in its morphological characteristics to Rhizopus oligosporus UQM 145F, but grew faster on potato-dextrose agar as well as in submerged culture. The new isolate was found to convert ground cassava tuber directly into single cell protein without pretreatment due to its high amyloglucosidase formation. From 100 g ground tuber, a dry biomass of 33.75 g containing 26.48% true protein together with 60 ml of highly active amyloglucosidase (282 units) was obtained in 123 h. The amyloglucoside was recovered by ultrafiltration, releasing 26.226 millimol glucose/l/min from soluble starch. The crude enzyme exhibited a pH optimum between 4.6 and 5.0, a temp. optimum between 55 and 60 C and an apparent Km of 3.125 g/l. High substrate concn. and ammonium sulphate are inhibitory to the enzyme. AS

TISSUE CULTURE

Nil

FOOD ADDITIVES

Sweeteners

Saccharin

536 Thomas (J), Wyrodek (A), Krause (W), Schaper (R) and Pietsch (HP). Determination of saccharin in foods. Nahrung 33(1); 1989; 83-85 (De).

CEREALS

537 Popineau (Y) and Pineau (F). Changes of conformation and surface hydrophobicity of gliadins. Lebensmittel-Wissenschaft und-Technologie 21(2); 1988; 113-117

Conformations of purified alpha-, beta- and gamma-gliadins were characterised in various solvents by gel permeation chromatography. Their surface hydrophobicities were measured in the same conditions by TNS binding. All gliadins undergo conformation modifications when pH and salt concn. were increased from 3.0 to 5.0 and 0 to 10^{2} -M resp. It results of a transistion from expanded conformation to more compactly folded structure. Aggregation occurred for highest values of pH and salt concn. resulting from the association of folded monomers. These conformation changes were accompanied by a decrease of accessible surface hydrophobicity. The decrease of Omega-gliadin hydrophobicity was particularly marked. In aggregation conditions also alpha-, beta-, gamma-, and Omega-gliadins differ by their surface hydrophobicities. AS

Rice

538 Hsieh (F), Huff (HE), Peng (IC) and Marek (SW). Puffing of rice cakes as influenced by tempering and heating conditions. Journal of Food Science 54(5); 1989; 1310-1312

Puffed rice cakes were produced from long grain brown rice by a pressure-drop puffing method. Effects of raw rice tempering conditions (time and moisture level) and heating conditions (temp. and time) immediately before puffing on rice cake vol. were investigated. In general, a lower moisture level (14% vs 16-20%) in raw rice and longer tempering time (5h vs 1-3 h) resulted in higher specific vol. in rice cakes. Higher heating temp. (230 C vs 200-220 C) and 8 sec heating produced rice cakes with higher specific vol. Darker cakes were obtained with the high temp. and long time combination. AS

Rice bran

539 Taira (H). Fatty acid composition of Indica- and Japonica- types of rice bran and milled rice. Journal of the American Oil Chemists" Society 66(9); 1989; 1326-1329

Fatty acid comp. of 10 cvs each of Indica- and Japonica- types of rice bran and milled rice were investigated. The Indica- type, as compared with the Japonica- type, had significantly higher palmitic, stearic, linolenic, and arachidic acid contents and lower linoleic and eicosenoic acid contents in the bran and milled rice, and lower oleic acid content in the bran. The correlation coeff. between oleic and linoleic acid contents of bran and milled rice was negative in the Indica- and Japonica-types and was the highest between all fatty acids. The regression line in the scatter diagrams between oleic and linoleic acid contents of bran and milled rice divided the Indica and Japonica lines. AS

Wheat

540 Lukow (OM), Payne (PJ) and Thachuk (R). The HMW glutenin subunit composition of Canadian wheat cultivars and their association with breadmaking quality. Journal of the Science of Food and Agriculture 46(4); 1989; 451-460

In this paper the results of investigation on the relationship between Glu-I scores and their breadmaking qualities for Canadian grown cvs are presented. Earlier studies were done in case of Western European cvs. For this purpose the proteins of 70 Canadian wheat cvs were fractionated by SDS-PAGE to determine their HMW (High mol. wt.) glutenin subunit comp. and Glu-I scores were calculated for 67 cvs. It was seen that three cvs chinook, cypress and supreza were found to contain novel HMW glutenin subunits and Glu-I scores accounted for 59-69% of the variation in breadmaking quality of these cvs whereas, flour, ash accounted for none and the implications of these results to wheat breeding programmes have been discussed. NGKR

541 Taha (SA) and Sagi (F). Sodium dodecyl sulpnate polyacrylamide gel electrophoresis of seed proteins as a test for screening high cooking quality durum wheat strains. Acta Alimentaria 17(4); 1988; 291-297

An improved method sodium dodecyl sulphate polyacrylamide gel electrophoresis (SDS-PAGE) was used to separate the glutenin subunits of seven durum wheat var. previously evaluated for quality and gliadin comp. Var. studied differ in the presence or the absence of two medium mol. wt. glutenin subunit bands denoted as MI and MII. Band MI appears to be linked with Gamma-gliadin 45 band and strong gluten plus good cooking quality, and band MII linked with Gamma-gliadin 42 band and weak gluten plus poor cooking quality. The described method can be used within a breeding program as a screening test for gluten strength and cooking quality in the early generations of durum wheat. AS

542 Warchalewski (JR) and Elockiewicz-Kaminska (E). The influence of alpha-amylase supplementation, irradiation (Co) as well as long time of storage of wheat grain on flour technological properties. Nahrung 33(1); 1989; 57-66

The var. of winter wheat, `Aria', and `Beta', were studied. The `Aria' var. was stored for the period of four yrs. The part of wheat grain from `Beta' var. was irradiated with gamma rays (^{60}Co). In extracts from wheat kernels and flour protein content, total alpha -and beta-amylolytic activity as well as alpha-amylolytic activity were determined. Alpha-amylases of native and fungal origin were added to the flour obtained from samples of stored wheat kernels (`Aria'), irradiated and non-irradiated (`Beta'). Consequently native alpha-amylase activity of flour increased by 25% and 50% resp. Extensive technological estimation of grain and flour with amylase supplements was carried out. The study included: sedimentation analysis, falling number test, milling exp., farinogram and extensorgram analyses, measurement of the degree of damaged starch and flour colour, as well as baking experiment. The obtained experimental loaves of bread were tested for their ability to remain fresh. It was found out that the stored grain flour was characterized by the highest alpha-amylolytic activity and the lowest falling number value, whereas the irradiated grain flour showed the highest degree of starch damage and water absorption. When alpha-amylase supplementation to doughs wasn't accompanied either by irradiation or storage of grain, it definitely changed their physical properties for the worse. The negative influence of native alpha-amylases appeared to be less significant than that of fungal alpha-amylases. The positive influence of alpha-amylase supplementations, especially of those increasing by 25% the native alpha-amylolytic activity of flour on vol., and freshness of loaves of bread was observed. AS

Wheat flour

543 MacRitchie (F). Identifying the baking quality related components of wheat flour. Cereal Foods World 34(7); 1989; 548-552

Fractionation and reconstitutions studies show that the dough strength and baking potential of a flour may be manipulated by varying the ratio of polymeric to monomeric properties (in glutenins to gliadins, albumins and globulins). The author confirmed the earlier finding about the relation between breadmaking quality and the properties of glutenin in flours. Search for gene giving expression to high amounts of glutenins would be useful strategy for improving the wheat quality. PHR

MILLETS

Corn

544 Burge (RM) and Duensing (WJ). Processing and dietary fiber ingredient application of corn bran. Cereal Foods World 34(7); 1989; 535-538

This article deals with beneficial effects of using corn bran as a source of dietary fiber. The functional properties of corn bran with respect to physical and physiological effects were also discussed. The high total dietary fiber (TDF), low caloric content and high water holding capacity combined with the excellent storage stability results in a wide range of current and potential product applications. PHR

545 Fapohunda (SO). Fungal flora of malting of Zea mays Linn. Nahrung 33(1); 1989; 3-7

Malting is a vital stage before fermentation of Zea mays to produce alcoholic beverages. Due to the raising of moisture level the grains are often associated with some moulds. Two of these fungi, i.e., Aspergillus flavus and Aspergillus terreus were isolated by the dilution plate technique. They reduced the percentage of oil, protein and carbohydrates of malted maize grains and increased the ash and fibre contents. Investigation on some cultural conditions indicated that alkaline pH enhanced the growth of A. terreus, and both species exhibited luxuriant mycelia growth and sporulation when incubated under an alternating light and dark regimes (at 24 h regular interval). AS

546 Lillehoj (EB) and Zuber (MS). Distribution of toxin-producing fungi in mature maize kernels from diverse environments. Tropical Science 28(1); 1988; 19-24

Maize kernels were obtained from geographically diverse regions of the world through the international maize testing programmes of the International Maize and Wheat Improvement Centre's (CIMMYT) cooperative programme. Surface-sterilized kernels were incubated and fungi that emerged were identified and counted. Predominant fungi were Aspergillus, Fusarium and Penicillium spp. More than two-thirds of the kernels obtained from Bolivia (83%), Mexico (67%), and Thailand (79%) were infected with A. flavus groups sp. whereas 17% to 42% of samples from Brazil, Burma, Ghana, Ivory Coast, and India were infected by sp. of the same group. A competitive interaction between A. niger and A. flavus groups sp. was not tested and elevated levels of Fusarium spp. were observed simultaneous with A. flavus group infections. AS

547 Mbata (GN), Osuji (FNC) and Okere (AN). Studies on the development biology of Corcyra cepalonica (Stainton) (Lepidoptera: Galleridiidae) on 13 maize varieties . Tropical Science 28(1); 1988; 25-34

Thirteen maize var. were investigated for suitability for oviposition and development of Corcyra cephalonica (Stainton). Two of these var. 8322-13 and TzSR-W-1, were highly preferred for oviposition and had means of 210 and 139.6 eggs deposited on them whilst TZPB-SR and 8425-8 had very few eggs deposited on them. Development from egg hatch to adult was fastest on MSC opaque, lasting 38.3 days, and slowest on the local var., lasting 66.5 days. Rearing the moths on broken kernels of the maize var. generally shortened their developmental period. Var. 8425-8, 8321-18W and 8329-15 were found to be resistant to infestation by the moth and sustained fewer losses, whilst var. MSC opaque, TZSR-1, Farz-23 and Farz-34 were highly susceptible and suffered more damage from infestation. AS

548 Tolaba (MP) and Suarez (C). Simulation of the thin-layer drying of corn by means of the diffusional model. Lebensmittel-Wissenschaft und-Technologie 21(2); 1988; 83-86

The aim of this study was to investigate fundamental aspects of the thin-layer drying of corn. Assuming negligible thermal diffusion and that diffusional resistance to moisture loss is uniformly distributed throughout the kernel, the standard solution of the transient diffusion equation with constant moisture diffusivity was applied to discribe the drying of grain corn. SRA

Corn starch

549 Wang (SS), Chiang (W-C), Yew (A-I), Zhao (B) and Kim (I). Kinetics of phase transition of waxy corn starch at extursion temperatures and mositure contents. Journal of Food Science 54(5); 1989; 1298-1301, 1326

Thermal energy effect on the phase transition of a waxy corn starch, Amioca, with different amount of water was evaluated by using differential scanning calorimetry. For water content less than 40% (w/w), the kinetics of the conversion of starch followed the pseudo-zeroth order. An activation energy of 44.25 Kcal/mol for 75% Amioca in the Amioca-water system were obtained from the Arrhenius relation. A useful correlation between the rate constant of conversion and a nondimensional temp. parameter T/T^{ρ} was found from various sources and with various moisture contents. AS

Finger millets

550 Samantray (GT), Misra (PK) and Patnaik (KK). Mineral composition of ragi. Indian Journal of Nutrition and Dietetics 26(4); 1989; 113-116

This paper describes a correlation between the mineral nutrients of seeds, six day seedlings and the malt of nine breeding var. of ragi (`A-2-3-4 T20', `B-4-10-56'., B 7-7-43', PR 202', `Sodangi 6' to `9', `Co 9' (mutant) and `Indat 5') collected from Orissa Univ. of Agric. & Tech., Bhubaneswar. The first six var. were brown coloured, the next two were white and one was black. One g from each of these seeds, seedlings and malt prepared from the respective ragi var. were analysed. Results indicated significant variation in Zn content of var. Ca content was higher in malt. White ragi var. had higher content of Fe, Zn, P, Ca, Cu, and Mg contents than the brown and black var. but this decreases gradually in the seedling and malt. Zn content was least in B 7-7-43 (23 p.p.m.) and max. in `T-20' and `PR 20-2' (50 p.p.m.) of grains. In seedling `B 7-7-43' contained max. Zn (30 p.p.m) and least was in `A 2-3-4' and `T-20' (22 p.p.m). The malt of `Indat-5' contained max. Zn (37 p.p.m.) and that of `PR 202' least (33 p.p.m.). NGKR

Sorghums

551 Youssef (AMM), Moharram (YG), Moustaffa (EK) and Bolling (H). Separations and identification of Egyptian sorghum non-tannin polyphenols. Nahrung 33(1); 1989; 31-36

The extraction, isolation and identification of the non-tannin polyphenols of both low- and high-tannin sorghum var. were studied. The results indicated that both low- and high-tannin var. contained 4 identical low mol. wt. fractions of non-tannin polyphenols. These fractions were not able to precipitate the gelatin and also gave negative results with the vanillin reagent. The other fractions were 6 in high tannin var. and 5 in low one. AS

PULSES

552 Jackman (RL) and Yada (RY). Functional properties of whey-pea protein composite blends in a model system. Journal of Food Science 54(5); 1989; 1287-1292

Protein from pea (Pisum sativum) and acid whey were combined in various proportions and several functional properties of resulting composites determined at pH 4 to 8. Solubility, heat stability, emulsion properties and foaming capacity were significantly ($P < 0.05$) reduced with decreasing pH (especially at pH 5) and increasing pea protein. Max. thermocoagulation of composites increased three-fold in magnitude and shifted from pH 4-5 to 5-6 as pea protein increased. A significant ($P < 0.001$) correlation between protein solubility and other functional properties was shown to be a direct consequence of the proportion of pea protein combined with whey protein, pH and their interaction. AS

553 Singh (U), Voraputhaporn (W), Rao (PV) and Jambunathan (R). Physicochemical characteristics of pigeonpea and mung bean starches and their noodle quality. Journal of Food Science 54(5); 1989; 1293-1297

This study compared the properties of pigeonpea and mung bean starches and noodles made from each. No large differences in size and shape of respective starch granules were observed. The degree of syneresis of pigeonpea starch was nearly three times that of mung bean starch. Swelling power of pigeonpea starch was considerably lower at 60 C and 70 C but it did not differ markedly at 80 C and 90

C. The Brabender viscosity patterns of 6% starch pastes of pigeonpea and mung bean indicated no pasting peak during heating to 95 C; neither showed breakdown of the hot paste. Sensory tests indicated that pigeonpea starch of dhal (decorticated dry split cotyledons) was as good for noodle preparation as mung bean dhal starch. AS

Beans

554 Garcia-Vela (LA) and Stanley (DW). Protein denaturation and starch gelatinization in hard-to-cook beans. Journal of Food Science 54(5); 1989; 1284-1285, 1292

A study was undertaken to assess protein denaturation and starch gelatinization in ground samples of common black beans exhibiting the hard-to-cook (HTC) defect. Using differential scanning calorimetry, no significant differences in either gelatinization or denaturation temp. were found between hard and soft beans but tropical storage conditions produced significant increases in gelatinization enthalpy and decreases in denaturation enthalpy. Endotherms of cooked samples showed as little as 34% of the protein had denatured in HTC beans as compared to over 85% in soft beans. Micrographs indicated the ground raw material was composed of clumps of cotyledon cells; cooking soft beans produced cell separation but this did not occur in HTC samples. These data supported the idea that bean hardening was accompained by limited water availability inside cotyledon cells that could reduce cell swelling, starch gelatinization and protein denaturation, leading to textural toughness. AS

555 Paredes-Lopez (O), Barradas (I) and Reyes-Moreno (C). Prediction of the effect of storage conditions on water content and water activity of common beans. Journal of Food Science 54(5); 1989; 1373-1374

Common bean (Phaseolus vulgaris) seeds from two cvs were grown in four different locations. After harvest, these seeds were stored at 32 C, 75% relative humidity, for 120 days. It is well known that unwanted effects in seeds (e.g. hard-to-cook) may be generated under these conditions. Water content and water activity were determined throughout this storage period. In general, increase of these parameters followed similar patterns for all samples. Experimental observations in all seeds were well described by a single equation. Prediction of water content and water activity by this equation may be useful for quality optimization of stored beans. AS

Black beans

556 Hussain (A), Watts (BM) and Bushuk (W). Hard-to-cook phenomenon in beans. Changes in protein electrophoretic patterns during storage. Journal of Food Science 54(5); 1989; 1367-1368, 1380

Effect of storage at elevated temp. and relative humidity on black bean cotyledon proteins was examined by polyacrylamide gel electrophoresis (PAGE) at pH 3.1. Electrophoregrams of acetic acid extracts of dehulled ground cotyledons of beans with storage-induced hardness showed concomitant changes with storage time. The changes were accelerated by higher temp. and humidity. AS

Carob

557 Mulet (A), Berna (A), Heredero (V) and Rossello (C). Temperature influence on the sugar extraction from carob pods. Lebensmittel-Wissenschaft und-Technologie 21(2); 1988; 108-112

Experiments on the extraction of sugar from carob pods have been carried out at 20, 30, 40 and 50 C resp., in order to study the temp. effect on the extraction rate. Particle size of the ground pods was between 0.5 and 1 cm. From exp. data and considering only the period where the mass transfer (sugars) occurs by diffusion, a characteristic kinetic eguation for this period has been established. AS

Chickpeas

558 Fernandez (ML) and Berry (JW). The effect of germination on chickpea starch. Starch/Starke 41(1); 1989; 17-21

Chickpea and germinated (36 h) chickpea starches were isolated to study the changes in starch upon germination. Iodine binding capacity of the starch did not change significantly indicating retention of amylose/amylopectin ratio during germination. However the gelatinization temp. range decreased sharply from 63-70 to 55-63 C. suggesting important changes in the intragranular structure of starch. Water binding capacity increased from 84% to 98% and acidity from pH 5.0 to 5.2. Digestibility of the starch by alpha-amylase also increased sharply. Scanning electron microscopy did not reveal, however, any change in the appearance of the granules. SZA

Cowpea flour

559 Obizoba (IC). Effects of germination, dehulling and cooking on the nutritive value of cowpea (Vigna unguiculata) flour. Journal of Food Science 54(5); 1989; 1371-1372

The effects of germination, dehulling and cooking on the nutritive value of cowpea flours supplemented with rice were studied in 20 adult rats. The 70:30 (protein basis) combination of cowpea flours and rice provided 1.6g N/100g diet for the 12-day balance study. Mixtures of whole, ungerminated, and uncooked beans (WUUB) and rice and whole, germinated and cooked beans (WGGB) and rice increased in seven of the parameters tested more than those of dehulled, ungerminated and uncooked beans and rice or dehulled germinated, uncooked beans (DGUB) and rice. The DGUB and rice mixture produced higher positive Ca and Mg balances than the WUUB and rice or the WGGB and rice mixtures. Germination and cooking appeared to be the best processing methods to provide nutritious foods based on cowpea in rats. AS

Dry beans

560 McTigue (MC), Koehler (HH) and Silbernagel (MJ). Comparison of four sensory evaluation methods for assessing cooked dry bean flavour. Journal of Food Science 54(5); 1989; 1278-1283

Flavour profile analysis (FPA), category scaling (CS), magnitude estimation (ME), and quantitative descriptive analysis (QDA) were compared in evaluating seven cvs of cooked dry beans. Statistical analyses indicated that FPA, CS and QDA evaluated the beans similarly, but at different levels of flavour intensity. The methods revealed differences between beans in some characteristics but not in other. ME data (not analyzed statistically) supported results from FPA, CS and QDA except for one cvs. There were slight differences in acceptability ratings following flavour evaluation by FPA, CS, QDA and ME. Variation between subjects was highly significant and consistent. Choice of method thus depends on type, amount and depth of sensory information required. AS

Peas

561 Aragon (JM) and Ocana (A). Kinetic study of the drying of pea seeds (Pisum sativum) and leek bulbs (Allium porrum) in spouted bed. Revista de Agroquimica y Tecnologia de Alimentos 28(3); 1988; 357-369 (Es).

Drying of pea seeds (Pisum sativum) and leek bulbs (Allium porrum) in spouted bed has been studied for obtaining kinetic information applicable to the design of such drying systems. The bed is held in a glass vessels, 56 cm diameter 75 cm height, with a troncochonical base ended by a 0.9 cm diameter orific through which hot air is fed. The operating conditions cover the range 40-70 C and 5.000-7.000 kg/m^2 h (temp. and air mass velocity). The solid particles sizes are about 1 cm (pea) and 0.5-1 cm (leek). The kinetic equations for both products have been evaluated taking into account the drying stages of constant and decreasing velocities. The values of kinetic parameters for pea seeds are compared with those obtained in fixed bed driers. For this product, the drying time required in spouted bed is about three to four times shorter than in fixed bed, its efficiency being also six to seven times greater. AS

562 Bajaj (KL) and Dhillon (GS). Peroxidase activity and chemical composition of some promising pea (Pisum sativum L.) varieties as affected by maturity. Tropical Science 28(1); 1988; 67-73

The chem. constituents, such as sugars, ascorbic acid, phosphorus, phenols, peroxidase activity, alcohol insoluble solids and total solids which are important quality attributes for processing of peas, were analysed at different stages of maturity in four important pea var. i.e. `Pb-87', `Pb-88', `Green Feast' and `Bonneville'. The var. `Pb-88' had optimum dry matter, alcohol insoluble matter and peroxidase activity and high and stable ascorbic acid. Total solids, alcohol insoluble solids and phosphorus content increased in all the var. with maturity and thus possibly could be used as a maturity index. AS

Snap beans

563 Van Buren (JP), Kean (WP) and Wilkison (M). Influence of salts and pH on the firmness of cooked snap beans in relation to the properties of pectin. Journal of Texture Studies 19(1); 1988; 15-25

Solute conditions inside cooked bean pods were adjusted by soaking the pods in different solutions. Interactions of Ca^{++} and Na^{++} showed increasing firmness as Ca^{++} concn. was raised and decreasing firmness as Na^{++} was raised. Chelating agents removed Ca^{++} and decreased firmness. Higher pH gave lower firmness except in the presence of excess Ca^{++}. The presence of Na^{++} decreased the effect of pH on firmness. Urea decreased firmness when pods had been previously treated with a chelator. The effects of treatments on firmness were related to the behaviour of pectin solutions and gels. AS

OILSEEDS AND NUTS

Groundnuts

564 Arthur (FH), Redlinger (LM) and Simonaitis (RA). The effect of loose-shelled kernels and foreign material on pirimiphos-methyl residues in stored farmers stock peanuts. Peanut Science 14(2); 1987; 59-61

565 Whitaker (TB), Dickens (JW) and Slate (AB). Grading peanut butter using video image analysis techniques. Peanut Science 14(2); 1987; 74-79

A video image analysis system was designed to quantitatively measure the amount of specks and the colour of peanut butter samples for grade purposes. The video image of a peanut butter surface 5.8 cm by 5.8 cm was captured and converted into 384 by 384 picture elements (pixels). The intensity of each of the 147,456 pixels was classified into one of 256 shades of gray from zero for black to 255 for white. The per cent of total pixels that represented specks was defined as the speck index. The average shade of gray of all 147,456 pixels was defined as the colour index. The speck and colour indices were computed for 52 peanut butter samples that had been graded by experienced Agricultural Marketing Service (AMS) inspectors. The speck and colour indices were both in good agreement with the AMS speck and colour classifications assigned to the samples by the AMS inspectors. AS

Linseeds

566 Mazza (G) and Biliaderis (CG). Functional properties of flax seed mucilage. Journal of Food Science 54(5); 1989; 1302-1305

Flax seed (Linum usitatissimum L.) mucilage was prepared by extraction of seeds with water followed by evaporation, precipitation with ethanol and freeze drying of extract. Proximate comp., solubility, foamability and moisture sorption characteristics were determined. The mucilage contained less carbohydrates, more minerals and more protein than commercial locust bean and guar gums. Its solubility, however, was higher than locust bean and guar gums, and lower than gum arabic. Flax seed mucilage exhibited good foam stability properties in aqueous solutions at 1.0% (w/v). Very diluted solutions exhibited Newtonian-like behaviour while shear thinning was shown at concn. above 0.2% (w/v). The viscosity was max at a pH range 6.0-8.0 and it was reduced in solutions containing NaCl. AS

Rapeseeds

567 Shahidi (F) and Gabon (J-E). Effect of methanol-ammonia-water treatment on the concentration of individual glucosinolates of canola. Journal of Food Science 54(5); 1989; 1306-1309, 1317

The effect of methanol-ammonia-water/hexane extraction of canola seed on the content of individual glucosinolates of their resulting meals was investigated. The level of original glucosinolates retained in the treated meals varied between 6% to 15% as determined by gas chromatography and HPLC. These correspond to values of about 4% to 10% for the aliphatic glucosinolates found in seeds routinely analyzed for canola designation. The concn. of these aliphatic, nonindole, glucosinolates in the treated meals was less than 1.8 µ mol/g while their total concn. did not exceed 4.3 µ mol/g of meal. AS

Soybeans

568 Aruna Seralathan (M), Susheela Thirumaran (A) and Neelakandan (S). Screening of soybean varieties. Indian Journal of Nutrition and Dietetics 26(3); 1989; 84-88

In this investigation a study on the screening of germ plasm materials of soybean for intensity of beany flavour, cooking time and protein, oil and moisture content was conducted with an object of helping the breeder in developing less beany flavoured var. The material was obtained from School of Genetics, T.N.A.U., Coimbatore and processed to prepare soy dhal. 30 var. of soybean were screened for beany flavour intensity and cooking time by open kettle method for cooling and sensory evaluation. The protein, oil and moisture content of the samples were analysed using an infra-analyser. The results showed the var. `IET-SL-III' had the least beany flavour (3.65 points) followed by `CO.1' and `Punjab-1 UGM.32'. The `Punjab-1 UGM.32' was found to have the lowest cooking time of 78 min with an average cooking time of 115 min. The mean protein, oil and moisture content were found to be 3.81 g, 276.75 g and 9.96 g resp. AS

569 Clark (PK) and Snyder (HE). Factors affecting the rapid equilibrium method for analysis of total oil in soybean cultivars. Journal of the American Oil Chemists" Society 66(9); 1989; 1316-1320

A one min. rapid equilibrium extraction for total oil in soybeans was developed and factors influencing the extraction were examined. Comparisons of the rapid equilibrium extraction with a Goldfisch extraction were made, using 100 mesh flour on ten cvs over a three yr. period. the equilibrium extraction consists of slurrying 100 mesh flour in hexane until an equilibrium between oil content inside and outside of the soybean particle is achieved. One min. was required for equilibration of 98% of the oil in the soybean flour, and one hour was required for complete equilibration when compared with a five hour Goldfisch extraction. Accuracy and precision of the method were excellent when proper technique was followed. A comparison of the rapid equilibrium and the Goldfisch extractions showed similar changes in oil content due to changes in soybean flour moisture and in preheating the soybeans. The amount of phospholipid extracted from fine flour were considerably less than usually extracted from flakes under commercial conditions. The correlation between the rapid equilibrium and goldfisch extractions for ten cvs was excellent a(r=0.9956) when analyzing 100 mesh flour. Environmental conditions caused significant interactions between cvs and yrs of production. AS

570 Katiyar (SK), Bhatia (AK) and Atal (CK). Proximal analysis and phospholipid composition of `Gabe muth' seeds-an indigenous black variety of Glycine max. L. Tropical Science 28(1); 1988; 13-17

`Gabe muth', a indigenous black var. of Glycine max L. is cultivated in some remote parts of the Kashmir valley in India. The seeds are nutritionally rich, containing 28.7% protein, 17.1% fat, 33.4% starch and 3.5% minerals. The total lipid contains 39.1% oleic, 20-.0% linoleic and 17.5% stearic acids as the major fatty acids. Phospholipid constitutes 12.5% of total lipid content in the seeds, wherein linoleic (37.8%), oleic (18.2%), linolenic (17.2%) and palmitic (15.4%) are the major fatty acids. Among the phosphatides, phosphatidyl choline (lecithin) is the major constituent (50.5%) of total phospholipid or 1.06% in the seeds. This legume might be utilized as an alternative commercial source of lecithin. AS

571 Lo (GS). Nutritional and physical properties of dietary fiber from soybeans. Cereal Foods World 34(7); 1989; 530-534

Soy fiber had distinctive functional and nutritional properties. The total dietary fiber (TDF) in the soybean cotyledon and soy hulls was respectively 79.8% and 75.6%. The nutritional aspects of soybean cotyledon fiber indicated that it has direct effect on the gastrointestinal tract by acting as a regulating agent in nutrient absorption and bowel function and an indirect effect on blood lipids and glucose metabolism. The author concludes by recommending the use of soy fiber in developing new formulations to meet the increasing demand of health conscious consumers. PHR

572 Simpson (TD). Fatty acid profile analysis of membrane phospholipids of isolated soybean lipid bodies. Journal of the American Oil Chemists" Society 66(9); 1989; 1309-1311

Phospholipids in isolated soybean lipid bodies at 30 C underwent degradation by acyl ester and phosphodiester hydrolysis and by phosphatidyl transfer. Under conditions that minimized oxidation, preferential loss of phosphatidylethanolamine and polyunsaturated fatty acids occurred, but acyl ester comp. of all phospholipids reflected enrichment of saturated and/or monounsaturated acids. Such fatty acid changes in phosphatidyl inositol, which was degraded less than phosphatidyl choline or phosphatidylethanolamine, and in phosphatidic acid, which accumulated, also suggest that transesterification occurred extensively in lipid bodies. The specific temporal changes in phospholipid and acyl chain comp. suggest that several enzymes remained active in isolated lipid bodies. AS

Soy flour

573 Horvath (E), Petres (J) and Czykor (B). Characterization of extruded full fat soy flour for human consumption. Acta Alimentaria 17(3); 1988; 245-255

Full fat soy flour was prepared from dehulled soybean (Glycine max) by extrusion used in the industry (Insta-Pro Extruder made in Hungary). It was characterized by different chemical and biochemical methods in order to determine the possibilities of its application in food products. The main components of the extruded soy flour was the following: water content: 5.8 g/100 g matter; protein content: 37.3 g/100 g dry matter; oil content: 24.6 g/ 100 g dry matter. The activities of trypsin inhibitor, lipoxygenase and peroxidase in extruded soy flour are significantly lower than in soybean, most of them being destroyed by the high temp. (140 C) of extrusion. In the course of extrusion peroxide and acid values increased, but this did not affect negatively the shelf-life of extruded full fat soy flour. Water and fat binding capacity are higher, emulsification properties and nitrogen solubility index (NSI) are lower in extruded soy flour than in soybean. Heat treatment denatures soy proteins, and the number of hydrogen and hydrophobic bonds increases. This is demonstrated by different solubilities of soy proteins in different solvents and buffers. After extrusion, lysine and sulphuric amino acid contents decreased, in vitro protein digestibility increased. The biological value of full fat soy flour characterized by NPU and NPR is nigher than the biological value of dehulled soybean. AS

Soy products

Soy chhana

574 Gangopadhyay (SK) and Chakrabarj (SR). Innovation of technology for preparation of soy-chhana (soy cheese). Indian Journal of Nutrition and Dietetics 26(5); 1989; 129-133

Processing parameters such as use of different coagulants and temp. of coagulation for preparation of soy chhana were studied. Soybeans (yellow var.) obtained from Calcutta market and chhana was prepared according to standard method. The products were analysed for total solids, fat, protein and also evaluated for sensory quality on a 9-point Hedonic scale by a selected panel of judges. Results showed that coagulation of soy-milk with citric acid or lactic acid at 90 C gave soy-chhana of highest quality which was soft and fragile whereas coagulation with calcium lactate at 90 C gave chhana with highest total solids, but having hard body and coarse texture. Best quality of chhana resulted with calcium lactate as coagulant at a temp. of 85 C with soft body and smooth texture, and elasticity similar to that of cow's milk chhana. NGKR

Sunflowers

575 Vaintraub (IA) and Kratch (VV). Changes in free and bound chlorogenic acid and in polyphenoloxidase activity during the industrial processing of sunflower seeds. Nahrung 33(1); 1989; 95-97

The discolouration of sunflower protein isolates which impairs their food use is brought about by the covalent binding of protein with the products of chlorogenic acid (CA) oxidation which proceeds both under the action of polyphenoloxidase (PPO) at pH values meat the neutral and by a nonenzymatic way at alkaline pH. The presence of PPO in sunflower seeds was established. Although its activity decreases during oil processing, moistening and increased temp. favour the enzymatic oxidation of CA and its coupling with protein. As a result the obtained cake may become unsuitable for food protein isolation. The decrease of free CA (extaracted by aqueous ethanol) during the heating of moistened sunflower seeds was described. It was attributed to the thermal decomposition of CA. These results do not exclude the covalent binding of CA with protein. The detn. of both free and bound CA was applied in this work to follow the changes of CA during the processing of sunflower seeds. The decrease of PPO activity was assessed simultaneously and the relationship between these two processes was discussed. AS

Sunflower proteins

576 Bulmaga (VP), Shutov (AD) and Vaintraub (IA). Modification of the solubility of sunflower protein isolates by superlimited proteolysis. Nahrung 33(1); 1989; 25-29

The modification of slightly soluble sunflower protein isolates by superlimited proteolysis (-0.1% splitting of the peptide bonds) raises 1.5-2-fold their solubility in neutral medium. The modification preparations may be isolated by isoelectric precipitation with a yield of 95-98% and became capable to form thermotropic gels. The yields of the isolates obtained from industrial solvent cake are lower (80-82%). The expenditure of proteinase is one order lower than in the usually employed methods of limited proteolysis and the duration of the process is several times lower. AS

TUBERS AND VEGETABLES

Carrots

577 Sajjaanantakul (T), Van Buren (JP) and Downing (DL). Effect of methyl ester content in heat degradation of chelator-soluble carrot pectin. Journal of Food Science 54(5); 1989; 1272-1277

Chelator-soluble pectin was isolated from carrot under mild conditions and used as a model compound for an investigation of the heat degradation mechanism of pectin in an aqueous environment. Methyl ester content was modified with minimal changes in the polymer size. At pH 6.1 the heated pectin preparation degraded primarily through beta-eliminative cleavage of the chain. The higher the methyl ester content the greater the degradation. Evidences also indicated a small amount of hydrolytic cleavage of glycosidic bonds which was not affected by the presence of the metnyl ester content. De-esterification of methyl ester groups proceeded at a faster rate than the eliminative cleavage of the chain; however, under the test conditions, it did not terminate the beta-elimination. AS

Onions

578 Gopalakrishna Rao (KP) and Srinivas (K). Studies on the storage behaviour of onion (Allium cepa L.) as influenced by nitrogen fertilization. Indian Food Packer 44(1); 1990; 5-11

N was applied to onion crop at levels of 0-200 kg N/ha and the onion bulb was examined for physical, chemical and storage behaviour. Application of N in two doses during growth period significantly increased the bulb wt., firmness, total soluble solids and sugars and decreased the DM. Rotting and sprouting of onion bulbs were higher during the storage with higher N which reduced the storage period. Increase of N level beyond 160 kg/ha caused steep increase in total storage losses were lower in `Arka Niketan' Var. than `Arka Kalyan' which could be stored only for 3 months, whereas the former could be stored for 6 months with about 27% storage losses. KAR

Potatoes

579 Beerh (OP), Manan (JK), Berry (SK) and Joshi (GJ). The quality of potato wafers made from cold stored potatoes of different varieties grown in Punjab plains. Indian Food Packer 44(1); 1990; 12-18

An improved process over the conventional process to overcome the discolouration of potato wafers prepared from cold stored potatoes of 10 var. is reported. Potatoes were cold stored (32-35 F) for months and were drawn at 4 months interval and conditioned by keeping at ambient temp. (20-30 C) for 10 and 20 days. Potato slices of 1.2-1.3 mm and 1.4-1.5 mm thickness were deep fat fried in groundnut oil at 160-180 C after giving some pre-treatment. With conventional process, potatoes of all the var. yielded brown to dark brown wafers before and after post cold storage conditioning for 10 and 20 days whereas in the improved process wafers were of golden colour in all the var. But due to the inherent turmeric yellow colour, the `Phulwa' var. did not yield acceptable wafers and the wafers of `K. Bahar' var. scored low due to its sweet taste. KAR

580 Boruch (M), Makowski (J), Wachowicz (M) and Dubla (W). Recovery of protein substances from potato juice. Nahrung 33(1); 1989; 67-76 (De).

A comparison of the following methods of separation of the nitrogenous substances from potato juices was made: combination of heat and acid coagulation, combination of ion exchange and heat coagulation and membrane concn. Each one of the above mentioned methods of recovery yields about 50% of nitrogenous compounds. By use of the combination of ion exchange and heat coagulation as well as membrane concn. free amino acids contained in the potato juice can be recovered additionally. The membrane concn. method (ultrafiltration) results in a super pure protein preparation. Compared with other methods the energy expenditure amounts to only a quarter. AS

581 Lilja (M) and Lingnert (H). Liberation of free fatty acids during production of potato granules. Food Chemistry 34(1); 1989; 15-23

The amount of free fatty acids and their comp. were studied during an add-back process of potato granules. Samples were taken at several different stages in the production, from raw tubers to final potato granules. Lipids were extracted and lipid classes separated by liquid chromatography. Free fatty acids were separated from the neutral lipid fraction by high performance liquid chromatography (HPLC). The fatty acid comp. was analysed by gas chromatography (GC). The amount of free fatty acid increased in the first stages of the process and rose to its highest level in the samples from the steam-cooking. During further processing the amounts of free fatty acids slowly decreased. Since enzymatic hydrolysis is one explanation for liberation of fatty acids, lipase activity was measured by a spectrofluorimetric method in the raw tubers, blanched slices and steam-cooked slices. After the blanching step some enzyme activity was found but after steam-cooking there was none. AS

Sweet potatoes

582 Damir (AA). Effect of heat penetration during cooking on some physico-chemical properties and microstructure of sweet potatoes. Food Chemistry 34(1); 1989; 41-55

The temp. at the central portion of sweet potato roots increased with prolonged blanching and baking times. However, the mode of heat penetration in blanched roots was different and that was directly correlated with the suitability for eating. The internal temp. obtained during the first 10 and 30 min. of blanching and baking processes, enhanced the amylase activity and resulted in major conversion of starch to reducing sugars. A slight increase in the amount of non-reducing sugars occurred upon cooking. The differences in the ultrastructure between raw and cooked sweet potato roots were studied with a scanning electron microscope. All the starch granules gelatinized with complete deformation of shape after blanching for 20 min., while those of baked roots showed great resistance to deformation. The dispersion of the starch suspension was evident after 30 and 50 min. in blanched and baked roots, resp. Variations in the over-cooked roots were studied. AS

Yams

583 Ahonkhai (S). TLC analysis of the 2,4-Dinitrophenylhydrazone derivatives of the carbonyl compounds of cooked, mature tubers of white yam (Dioscorea rotundata Poir). Acta Alimentaria 17(4); 1988; 283-289

The hexane extractable carbonyl compounds of cooked mature tubers of white yam (Dioscorea rotundata Poir) were precipitated as the 2,4-dinitrophenyl hydrazone (2,4-DNPH-one) derivatives. TLC was used to analyse the derivatives. A total of eight carbonyl compounds (four aldehydes, three ketones and one ketoacid) were identified. AS

584 Wickham (LD). Extension of dormancy in cush-cush yams (Dioscorea trifida) by treatment with gibberellic acid. Tropical Science 28(1); 1988; 75-77

Gibberellic acid treatment extended the length of dormancy and reduced the rate of wt. loss in tubers of Dioscorea trifida. AS

Vegetables

585 Horler (BAT). Determination of arsenic and selenium in vegetable and herbage samples by X-ray fluorescence spectrometry using coprecipitation. Analyst 114(8); 1989; 919-927

A procedure is described for the detn. of both As and Se in vegetable and herbage samples. Organic material was destroyed by nitric acid in the presence of Mg and Ni nitrates, prior to the separation of the analytes. The As and Se were separated from solution by reduction to the elements using tellurium as a carrier and hypophosphorous acid as reductant. The precipitated analytes together with the carrier were collected by filtration and the filter was examined directly in the wavelength-dispersive X-ray fluorecence spectrometer. For a sample mass of 1 g the procedure has a detection limit of 0.1 μ g of As and Se and the calibration is linear up to atleast 25 μ g of the analytes. The accuracy and precision of the procedure are better than 3% relative at the 4 μ g^{-1} level. AS

586 Lintas (C) and Cappeloloni (M). Content and composition of dietary fiber in raw and cooked vegetables. Fodd Sciences and Nutrition 42F(2); 1989; 117-124

The content of total dietary fibre (DF), measured as the sum of water-insoluble and water-soluble fractions, was evaluated in 21 raw and 33 cooked vegetables in common use in Italy. The DF content was determined using the AOAC enzymatic-gravimetric method. The total DF content ranged from 0.8 to 3.1 g/100 g for the raw and 1.3 to 7.9 g/100 g for the cooked vegetables. With few exceptions (mainly artichoke and, to a lesser extent, carrot, onion, pepper and potato) the vegetables are characterized by a marked prevalence of insoluble fibre components (insoluble fibre components > 70% of total DF). To improve filtration, in some cases sample size was reduced to 0.5-0.7 g. On ten of the vegetables, usually consumed either raw or cooked, the effect of cooking on DF content and distribution was also evaluated. Cooking had limited influence on the total DF content of the samples (a cooked/raw DF ratio close to 1 in most cases), but a slight solubilization of fibre components from insoluble to soluble was observed in all cases. AS

Cucumbers

587 Chan (HTJr) and Linse (E). Conditioning cucumbers to increase heat resistance in the EFE system. Journal of Food Science 54(5); 1989; 1375-1376

The ethylene-forming enzyme system (EFE) in cucumber fruit (Cucumis sativus L. cv. Burpee Hybrid II) developed an increased tolerance to hot water immersions of 30 to 60 min. at 45 C and 30 to 50 min at 46 C when conditioned at 32.5 plus or minus 0.5 C in air for 24 h. Thermodynamic analysis of the heat inactivation of the ethylene-forming enzyme (EFE) system in conditioned and unconditioned cucumbers showed: Increased D-value in the heat resistant EFE of conditioned cucumbers; larger energies of activations and Q_{10} for conditioned cucumbers; larger entropy and enthalpy changes in conditioned cucumbers. The EFE system in conditioned cucumbers was in a more ordered state than in control cucumbers which was speculated to be due to the formation of hydrophobic bonds during conditioning thereby increasing the thermostability of the EFE system. AS

588 Howard (LR) and Buescher (RW). Cell wall characteristics of gamma-radiated refrigerated cucumber pickles. Journal of Food Science 54(5); 1989; 1266-1268

The effect of gamma radiation (0, 0.5, and 1.0 kGy) on firmness and changes in cell wall polysaccharides of mesocarp tissue from refrigerated cucumber pickles was examined. Softening of mesocarp tissue of pickles exposed to 1.0 kGy was a response associated with altered solubility characteristics of pectic substances. Ionizing radiation reduced non-soluble and alkali soluble pectic substances, while levels of water and chelator soluble pectic substances were increased. Radiation reduced the degree of esterification of pectic substances and increased the amount of bound Ca. Except for all small reduction in galactose caused by 1.0 kGy, levels of other neutral sugars in the cell wall were not significantly affected by any of the treatments. AS

Leafy vegetables

Alfalfa

589 Favati (F), Fiorentini (R) and Galoppini (C). Pigment extraction from alfalfa protein concentrates. Acta Alimentaria 17(3); 1988; 239-241

The increasing demand for food-grade proteins makes the use of leaf protein conc., (LPC) an interesting approach. LPC have good amino acid profiles but their organoleptic characteristics, above all the green colour and the grassy flavour, strongly limit their use. Nine pure solvents and seven solvent mixtures were tested in order to verify their suitability for improving the organoleptic characteristics of LPC. Sensory evaluation was carried out on LPC after a solvent extraction period of 6, 12 and 18 h. Polar solvents, especially acetone and propane-2-ol gave the best results, both for colour and flavour, but none of them was able to reduce the negative characteristics to such an extent that could make possible the use of LPC in human nutrition. AS

Spinach

590 Baardseth (P) and Von Elbe (JH). Effect of ethylene, free fatty acid, and some enzyme systems on chlorophyll degradation. Journal of Food Science 54(5); 1989; 1361-1363

Chlorophyll degradation was studied in two var. of spinach in the presence or absence of ethylene. Acceleration of degradation due to the presence of ethylene could not be demonstrated. Gradual disappearance did not coincide with activation of chlorophyllase, nor did it produce any new coloured compounds. Catalase activity decreased during storage, while peroxidase activity increased. Addition of linoleic acid and various enzymes to model systems containing chlorophyll a accelerated degradation of chlorophyll. Rate of degradation was reduced by addition of antioxidants, catalase or superoxide dismutase suggesting involvement of both single oxygen and mol. oxygen in the bleaching process. AS

Tomatoes

591 Daood (HG) and Biacs (PA). Partial purification and properties of lipoxygenase from germinated tomato seeds. Acta Alimentaria 17(4); 1988; 333-334

592 Doxastakis (G), Kiosseoglou (V), Boskou (D) and Stalidis (G). Adsorption behaviour of tomato seed proteins at the corn-oil water interface. Lebensmittel-Wissenschaft und-Technologie 21(2); 1988; 96-99

The study aims at investigating the adsorption behaviour at oil-water interface of tomato seed proteins because it is known that this property may be of great importance to emulsification process and may eventually affect the emulsion stability. The study has revealed the properties of tomato seeds isolate proteins. Tomato protein adsorption brings about a marked decrease in the interfacial tension between corn oil and water; salt bridges as well as hydrophobic bonds may be responsible for the stabilisation of the mol. structure; Following absorption, the protein molecules retain a degree of internal structure which does not allow them to openup completely because an increase in the temp brings about an additional unfolding of their structure. SRA

593 Marangoni (AG), Brown (ED), Stanley (DW) and Yada (RY). Tomato peroxidase. Rapid isolation and partial characterization. Journal of Food Science 54(5); 1989; 1269-1271

A rapid method for the isolation of tomato anionic peroxidase (TAPR) was developed using Fast Protein Liquid Chromatography. TAPR was purified 295 times to an RZ value of 0.7. The rate constant for the formation of compounds I was 1.53×10^{7} M^{-1} sec^{-1} and for compound II was (6.93×10^{5} M^{-1} sec^{-1} . TAPR had max. activity at pH 5.0-5.2 and an isoelectric point at pH 3.5. SDS gel electrophoresis showed three major bands at 16.6, 40.0, and 42.0 KD. TAPR demonstrated a Ca dependancy for activity, exhibiting a max. at a concn. of 1.0×10^{-5} M. AS

Tomato powders

594 Kunzek (H), Schonfelder (U), Leps (C) and Heilscher (K). Examination about the quality of colour and of the thermostability of tomato powders. Lebensmittelindustrie 35(4); 1988; 174-177 (De).

Examinations about the quality of the colour and the thermostability of tomato powders by colorimeters working after the three-area system make possible the objective characterization of the quality. The destruction of the colouring agents by thermical load can be recorded as securely as the appearing browning reactions. AS

FRUITS

595 Gunasekaran (S), Fisher (RJ) and Casmir (DJ). Predicting soluble solids extraction from fruits in reversing, single screw counter diffusion extractor. Journal of Food Science 54(5); 1989; 1261-1265

A single-screw, intermittent-reversing counter current diffusion-extractor (CCDE) was used. Two mathematical models were developed to predict soluble solids concn. profile along the length of the CCDE. Both models predicted an exponential concn. profile and good intra-flight mixing. Experimentally obtained soluble solids concn. profiles in the CCDE using apples and pears validated the model predictions. AS

596 Sharma (PC). Corrugated cartons for fruit packaging in Himachal Pradesh. Packaging India 21(2); 1988; 27-28

Briefly discusses the types of corrugated cartons used in fruit packaging. SRA

Apples

597 Perring (MA). Changes in dry matter concentration gradients in stored apples. Journal of the Science of Food and Agriculture 46(4); 1989; 439-449

Longitudinal and transverse dry matter concn. gradients were measured in Cox's Orange Pippin apples at harvest and during storage. Dry matter concn. was higher at the calyx end of the fruit at harvest than in the central zone and at the stalk end. This difference was maintained as dry matter concn. in the whole fruit declined during cold storage. Dry matter concn. decreased from the peel to the core in median transverse slices at harvest but this gradient diminished during storage at 4 C in either air or 1.25% v/v oxygen. After 11 wks storage dry matter concn. became generally lower in all zones of the air-stored fruit than those in apples stored in 1.25% v/v oxygen, but transverse distribution patterns of dry matter were similar in apples in either regime throughout storage. Proportions of dry matter in the outer zones declined whilst those in the inner cortex and core increased. The relavance of these changes to the quality of stored apples is discussed. AS

Bananas

598 Dillon (M), Hodgson (FJA), Quantick (PC) and Taylor (DJ). Use of the APIZYM testing system to assess the state of ripeness of banana fruit. Journal of Food Science 54(5); 1989; 1379-1380

The APIZYM activity profiles of untreated fruit ripening at 20 C and 85% RH were compared with those from fruits treated with Pro-long, a fruit coating material, and fruit stored under controlled atm. conditions (5% O, 95% N) at the same temp. and RH. Banana fruits coated with Pro-long or stored under CA conditions ripened more slowly than untreated fruits, and this was reflected in lower activity of some enzymes during the storage period in coated and CA-stored fruit. Reduced activity in these treatments was more noticeable at day 4 of storage than day 7, however, even at day 7, the activity of certain enzymes was still lower than in controls. AS

599 Gwanfogbe (PN), Cherry (JP), Simmons (JG) and James (C). Functionality and nutritive value of composite plantain (Musa paradisiaca) fruit and glandless cottonseed flours. Tropical Science 28(1); 1988; 51-66

Plantain (Musa paradisiaca) flours from fruits that are lyophilized, oven-dried, or vacuum oven-dried and hexane-defatted, contain an average of 2.9% protein, 0.7% fibre, 1.8% ash and 86.0% carbohydrate. Vitamins B_1 , B_2 C, and niacin activity, and the minerals Ca, K, Mg, P and Fe, are present in good quantities. The oil extracted from the fruit contains mainly oleic, linoleic, linolenic and palmitic acids. The protein is good source of isoleucine,

leucine, lysine, and especially histidine, alkaline and salt solutions extracted 2-3 times more protein than water; adding sodium dodecyl sulphate to the water produced similar proportions. The plantain flours perform poorly in functionality tests for emulsification, foamability, and water and oil absorption, but these properties are greatly improved when the flours are blended with glandless cottonseed flour. Nutritionally, tryptophan is the most limiting amino acid of plantain flour. Plantain and cottonseed blends have improved comp. of isoleucine, leucine, lysine and histidine. AS

Breadfruits

600 Whitney (PJ). The microbiology of breadfruit and cassava preservation by pit fermentation. Tropical Science 28(1); 1988; 43-50

The traditional South Pacific method of preservation of breadfruit by pit fermentation is described and illustrated. The type and numbers of organisms involved, pH changes and volatile organic products of fermentation were studied. The present knowledge of microbial and nutritional changes in breadfruit fermented in this way is briefly reviewed and discussed. Consideration is given to the possibility of commercial production of a cheese-like product from starchy foodstuffs. AS

Grapes

601 Cheynier (V), Snuquet (JM) and Moutonnet (M). Glutathione content and glutathione to hydroxycinnamic acid ratio in Vitis vinifera grapes and musts. American Journal of Enology and Viticulture 40(4); 1989; 320-324

Glutathione (GSH) was analyzed by high performance liquid chromatography following derivatization using Ellmann's reagent in the berries of 28 grape var. from different locations and in the corresponding white musts. The hydroxycinnamic acid to glutathione molar ratios were determined for each sample. GSH concn. varied from 56 to 372 μ mol/kg in grapes and from 46 to 333 mM in musts. The hydroxycinnamic acids to glutathione ratio was consistently higher in the entire berries than in the corresponding musts. The extreme values were 1.3 and 12.7 in berries and 0.6 and 10.5 in musts. Growing site related differences were also pointed out. AS

Jackfruits

602 Begum (K), Padma Umapathy (K), Daniel (VA) and Swaminathan (M). Effect of partial replacement of cereal in rice and ragi diets by jackfruit seed flour on the nutritive value of diets. Indian Journal of Nutrition and Dietetics 26(5); 1989; 141-143

The effect of replacing cereals partially with jackfruit seed flour in cereal based diets on the overall nutritive value of the Indian diets have been studied. The growth rate of rats and feed efficiency ratio of the cereal diets were compared with diets in which rice and ragi were replaced with jackfruit seed at 25 % level. Results showed that the wt. gain in ragi and rice diet was 47.0 and 22.9 g and on replacement with jackfruit seed it was 51.8 and 30 g resp. The corresponding FER obtained with and without jackfruit seed was 0.16 and 0.15 for ragi diet and 0.11 and 0.10 for rice diet resp. Hence no significant differences in the growth promoting value of diets was seen by replacing rice or ragi with jackfruit seed at 25% level. NGKR

603 Begum (K), Padma Umpathy (K), Daniel (VA) and Swaminathan (M). Nutritive value of the protein of jackfruit (Artocarpus integrifolia) seed meal and effect of supplementing with methionine and tryptophan or milk proteins. Indian Journal of Nutrition and Dietetics 26(3); 1989; 68-74

The chemical comp. and nutritive value of jackfruit seed meal and effect of supplementing with methionine and tryptophan or milk proteins are studied. Jackfruit seed meal was found to be a good source of protein (13.6%) and Fe (11.5 mg). However it was deficient in total S-amino acids (1.77 g/16 g N) and tryptophan (0.6 g/16 g N). Methionine and/or tryptophan supplementation significantly raised the PER from 0.43 to 0.73. Supplementing with milk proteins at 1:1 ratio in a 10% protein diet raised the PER to 1.65. NKGR

Litchi

604 Nip (W-K). Handling and preservation of lychee (Litchi chinensis, Sonn) with emphasis on colour retention. Tropical Science 28(1); 1988; 5-11

Literature on the handling and processing of litchi (Litchi, lizhi) has been reviewed, with special emphasis on the colour retention of fruit. Maintaining quality(especially colour retention) in its various forms (fresh, refrigerated, frozen, canned and dried) is difficult. No single process has been reported to be effective in retaining colour for all the various products. AS

Mangoes

605 Tandon (DK) and Kalva (SK). Utilisation of mango waste. Beverage & Food World 16(1); 1989; 21-22

Reviews briefly the work done and suggest probable uses of waste from mango processing industry and also from commercially unacceptable mango fruits. Aspects covered include processing mango wastes, commercially unacceptable fruits, and future investigations. 8 references. SRA

Oranges

606 Jitender Kumar, Sharma (RK), Ran Singh and Godara (RK). Increased shelf-life of kinnow mandarin (Citrus reticulata) by different storage conditions and chemicals. Indian Journal of Agricultural Sciences 60(2); 1990; 151-154

Kinnow oranges were treated with 0.2% captaf or diphenyl at the rate of 0.5 g/pack dissolved in acetone and applied to the paper lining. These fruits were packed in wooden boxes with paper lining as cushioning and packed in 100-gauge polyethylene bags. They were stored for 70 days at room temp. (25 plus or minus 5 C temp. and 45 plus or minus 5% RH) or in 0-energy chambers (20 plus or minus 5 C temp. and 60 plus or minus 5% RH). Observations made at weekly intervals showed that the physiological loss in wt. (PLW) did not show significant differences with any of the chemicals or the storage conditions after 28 days in reducing PLW. No treatment showed decay loss upto 28 days of storage. But at later stages captaf was most effective in reducing decay loss (6.3% for captaf, 11.80% for diphenyl and 13.72% for control). Fruits stored in 0-energy chambers showed less decay than those stored at room temp. Total soluble solids and acidity were not affected by any of the chemicals or storage conditions during the 70 days of storage. KAR

Peaches

607 Senter (SD), Robertson (JA) and Meredith (FI). Phenolic compounds of the mesocarp of Cresthaven peaches during storage and ripening. Journal of Food Science 54(5); 1989; 1259-1260, 1268

Prominent phenolic compounds in the mesocarp of Cresthaven peaches are chlorogenic acid, caffeoyl derivative, epicatechin, catechin, and cyanidin. Trace amounts of p-hydroxyphenylacetic, gallic, gentisic, and protocatechuric acids, quercetin, myricetin, and delphinidin are also present. Little changes occurs in the quantities of these compounds in immature, threshold mature and mature fruit during storage at 0 C with subsequent ripening at 20 C. HPLC analysis determined that small but significant changes occur in the quantities of epicatechin in the threshold mature and mature fruit during storage and in the quantities of cyanidin in the immature fruit. Changes in the degree of polymerization of these compounds did not vary as determined by vanillin-leucoanthocyanidin ratios. AS

Pineapples

608 Iversen (E), Wilhelmsen (E) and Criddle (RS). Calorimetric examination of cut fresh pineapple metabolism. Journal of Food Science 54(5); 1989; 1246-1249

Isothermal microcalorimetric analysis of cut fresh pineapple was used to examine metabolic events occurring in the fruit under different storage conditions. The results define conditions most suited for cut pineapple storage. The baseline heat production for pineapple tissue is quite low (0.2 μ W per mg wet wt.). During storage, heat producing metabolic reactions develop which cause spoilage of the fruit. The time course of heat production during storage is affected by changes in atm. and by chemical treatments. Effects of inhibitor and antibiotic additions indicate that most of the heat production associated with spoilage is related to the growth of microbial flora. AS

Pummelo fruits

609 Waks (J), Chalutz (E), Lomaniec (E), Daus (A) and Ben-Yehoshua (S). Physiological and pathological observations on the post-harvested behaviour of pummelo fruit. Tropical Science 28(1); 1988; 35-42

Several post-harvest characteristics of the pummelo (Citrus grandis L. Osbeck) were studied. Pummelo fruit has a relatively long post-harvest life and can be stored without treatment at 11 C and 90% relative humidity for 8 to 12 wks. The fruit is sensitive to chilling injury at storage temp. of 10 C or lower, and becomes increasingly sensitive to fungal rot development in storage with the progression of the growing season. Individual seal-packaging of pummelo fruit with plastic films reduced decay, particularly during longterm storage, while curing the sealed fruit further reduced incidence of decay. AS

CONFECTIONERY, STARCH AND SUGAR

610 Baron (A), Saulier (B), Prioult (C) and Drilleau (J-F). An automated method for determination of polysaccharidase activities. Lebensmittel-Wissenschaft und-Technologie 21(2); 1988; 92-95 (De).

The 2-cyanoacetamide method for detn. of reducing carbohydrates was automated and adapted to determine the polysaccharidase activities from commercial preparations. Influence of heating time, pH, reagent concn. and interference with some chemical compounds were investigated. AS

Confectionery

611 Paper (T). The use of xylitol in confectionery production. Confectionery Production 55(3); 1989; 253-256

The application of xylitol to the production of confectionery products and technical properties (sweetness, cooking, effect) and applications (confectionery, chewing gum, hard candies, gums and jellies, chewy sweets, mints, chocolate, reduced calorie confectionery, pharmaceuticals, oral hygiene products, infusion solutions and diabetic products) are covered. SRA

612 Shuleva (JJ). Monitoring and controlling oil migration in peanut butter confections. Manufacturing Confectioner 69(5); 1989; 72-74

In this article methods for controlling oil migration, oil migration testing, matrix stability during processing and storage, total migration control are discussed. The application of this technique can lead to a greater presence of peanut butter products in the confectionery market place. SRA

Chocolates

613 Garrone (W), Antonucci (M), Bona (U) and Clementi (S). Determination of hazelnut content by means of their protein fraction in chocolate bars, chocolates and milk containing spreads. Lebensmittel-Wissenschaft und-Technologie 21(2); 1988; 76-82

An electrophoretic procedure utilizing the protein fraction of hazelnuts is described to determine the roasted hazelnut content in sweet creams or spreads. The electrophoretic data were statistically analysed by the Partial Least Square method, a multivariate calibration tool particularly suitable for food chemistry. With this approach, the coeff. of variation of hazelnut determined in a sample is 11%. AS

614 Kattenberg (HR). The effect of cocoa butter on chocolate tempering and bloom. Manufacturing Confectioner 69(5); 1989; 77-81

In this paper in relation with the tempering of chocolate mass the following aspects are discussed: the crystallisation and comp. of cocoa butter. SRA

615 Markov (E) and Tscheuschner (H-D). Examination of the texture of chocolate (II). Lebensmittelindustrie 35(4); 1988; 167-169 (De).

Starch

616 Cai (W), Athanassoulias (C) and Diosady (LL). A high performance size exclusion chromatographic method for the analysis of the molecular weight distribution of starch. Acta Alimentaria 17(4); 1988; 319-332

Three high performance size exclusion chromatographic (HPSEC) systems have been developed for investigating changes in the comp. of wheat starch. The preparation of starch solutions was found to be an important factor in obtaining reproducible chromatograms of high mol. wt. starches. In the best technique developed, dimethyl sulphoxide (DMSO) solutions of raw and processed starch extruded in a single screw extruder have been analyzed on styrene-divinylbenzene packed columns operated at 80 C with DMSO as the eluant. Changes in the molecular size distributions of amylopectin were evident in the chromatograms of processed starch and the magnitude of the changes was related to the severity of the processing conditions. In the absence of sufficient high mol. wt. reference materials, ratios of areas under the chromatographic peaks were used to express quantitative changes in the mol. size distributions. AS

617 Morrison (WR) and Coventry (AM). Solvent extraction of fatty acids from amylose inclusion complexes. Starch/Starke 41(1); 1989; 24-27

The extractibility of palmitic and other common fatty acids from inclusion complexes with potato amylose was studied using a wide range of common lipid solvents. At ambient temp. negligible yields were obtained with light petroleum or diethylether. Yields were low with most other solvents except those containing methanol or water. At 100 C, methanol, ethanol and propanol and all alcohol water mixtures gave good yields. Complexes of amylose with 1-O-palmitoyllyso phosphatidylcholine also gave good yields, when extracted with propanol water (3:1) at 100 C. Since more rigerous conditions are required for extraction of lipids from native cereal starch granules, it seems that the barrier of lipid extraction is the structure of granule, rather than the resistance to lipid extraction of any possible inclusion complexes in the granules. SZA

BAKERY PRODUCTS

Bread

618 Collar (C), Benedito de Barber (C) and Barber (S). Chemical changes during bread-dough fermentation. IX. Protein fraction from liquid phase of dough. Revista de Agroquimica y Tecnologia de Alimentos 28(3); 1988; 407-414 (Es).

Chemical changes during bread dough fermentation (28 C, 85% RH) in extractability of liquid phase (total solids and protein contents) and in electrophoretic behaviour (fractionation and characterization) of protein fractions and different mol. wt. subfractions of liquid phase separated by ultracentrifugation from unfermented and fermented wheat bread doughs are investigated. During fermentation, amount of liquid phase separated as well as total solids content increase whereas total protein content decreases. Polyacrylamide slab gel electrophoresis shows quantitative and qualitative changes mainly in the lowest (3,500-14,000 daltons) and highest (80,000-90,000 daltons) mol. wt. protein subfractions. AS

619 Tovar (J), Bjorck (I) and Asp (NG). On the nutritional properties of starch and dietary fiber in cassava bread. Nutrition Reports International 39(6); 1989; 1237-1246

Soluble fiber accounted for 10% of the total dietary fiber content in cassava bread. The soluble fraction consisted of mainly uronic acid and glucose polymers (pectins and beta-glucans), whereas the insoluble fraction was rich in cellulose and lignin. Cassava bread starch showed a high degree of gelatinization (97%) and was completely hydrolyzed by microbial alpha-amylase/amyloglucosidase treatment. Its rate of hydrolysis at moderate concn. of pancreatic alpha-amylase was, however, slower than that observed for boiled wheat starch. This difference did not persist after pepsin predigestion of cassava bread. An isolated total dietary fiber fraction from cassava bread, as well as guar gum, decreased the release of starch digestion products from dialysis tubings. Either material also lowered the rate of gastric emptying in rats. These results suggest two reasons for the low in vitro digestibility index previously reported for cassava bread: a limited starch availability due to starch-protein interactions, and fiber-related changes in the viscosity of the medium. This feature, besides the observed retardation of gastric emptying caused by its fiber constituents, makes cassava bread an interesting product to be tested for its in vivo glycaemic response. AS

Kadhi

620 Ghosh (BC) and Satia Kulkarni. Dehydrated kadhi-a convenience food. Indian Dairyman 42(1); 1990; 11-14

Kadhi is a mildly acidic dairy product of India prepared from fermented milk after adding Bengal gram flour (5%), turmeric and salt. Flow diagram has been given to present the process involved in the preparation of kadhi. The final products with 14-16% solids was dried on a double drum roller drier. Reconstitution of the product is done by adding 4 parts of boiled water to one part of kadhi spices (chilly, mustard, cumin seeds, etc.) were added while boiling the reconstituted product. The dehydrated product kept well for 12 wk when packed in low density polyethylene pouches. KAR

Macaroni

621 Taha (SA) and Sagi (F). Comparative biochemical study on the effect of drying temperature on macaroni quality. Acta Alimentaria 17(4); 1988; 299-207

Chem. comp., oxidative enzyme activities, colour, strength and cooking quality of macaroni dried under high temp. (HT) and low temp(LT) programs were compared. Drying of macaroni at HT compared to LT increased the losses of soluble protein and total lipids, decrased carotenoid pigment losses, inactivated lipoxygenase (LPO), peroxidase (PO) and polyphenoloxidase (PPO) in greater extent, increased the yellow index (YI) and decreased the brown index (BI). Raw macaroni strength and cooking quality were loss affected by the drying temp. Drying of macaroni at HT offers definite advantages over the LT system. Beside the reduction of drying time, HT programme yields a macaroni with improved colour without sacrifying cooking quality, strength or nutritional value. AS

MILK AND DAIRY PRODUCTS

Milk

622 Gabriell Favretto (L), Pertoldi Marletta (G), Bogoni (P) and Favretto (L). Chemometric studies of some trace elements in cows milk. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 189(2); 1989; 123-127

The matrix of the correlation between the concn. of 11 trace elements determined in 45 samples of cow's milk was used as a starting matrix for principal component analysis. The space dimension was reduced from 11 variables to 5 principal components, accounting for about 80% of the total variance. After an orthogonal rotation, the first factor (F1) was found to be positively correlated with Cr, Mn, and Fe, F2 positively correlated with Ni and negatively with Cu, F3 positively with Cd and Pb, F4 positively with Zn, Sr, and Mo and F5 positively correlated with Al and Sr. Element clusters appear to be determined by the origin. Some clusters are confirmed by principal factor analysis. A plot of the principal component scores was also applied to the differentiation of Italian milk from different geographical origins. AS

623 Gangopadhyay (SK) and Paul (SC). Hydrocolloids. A useful ingredient in dairy industry. Indian Dairyman 42(1); 1990; 5-9

Hydrocolloids have wide application in milk and milk products to improve the sensory quality of the final products. Authors review reactivity of hydrocolloids with milk proteins, besides covering its application in milk, high fat milk products, cultured dairy products, frozen dairy products, coagulated dairy products and dried milk products. 29 references. KAR

624 Jandal (JM). Use of carbon dioxide in dairy industry. Beverage & Food World 16(1); 1989; 19-20

Keeping quality of milk can be improved by carbon dioxide treatment prior to refrigeration by 3 to 4 times without the need for preservatives because carbon dioxide is effective for extending the shelf-life of milk by retarding bacterial growth. When carbon dioxide is used it can be removed from the milk by using warming under pressure or nitrogen as inert gas. SRA

625 Kyoke-Hutter (K) and Malisch (R). Polychlorinated biphenyls. Determination of the individual components in raw milk and contaminated silages. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 188(2); 1989; 127-134 (De).

Since 1980, 2145 samples of raw milk from producers in the district of Freiburg have been analysed for polychlorinated biphenyls (PCB) during a monitoring programme. In 1983, we started to search for the source of PCB, whenever milk was contaminated above the average value (above 0.2 mg/kg fat, calculated as Clophen A60). In 7 cases, previous coats of paint in the silos proved to be the cause of the PCB contamination. Five samples of milk and 4 corresponding silages as well as 1 sample of wood (from a cowshed) were investigated for all of the individual PCB components included in the technical mixtures of Clophen A30 and A60. Two samples of silages contained both low and high chlorinated biphenyls, whereas low chlorinated biphenyls (di-, tri-, and tetrachlorinated biphenyls) were not detected in the corresponding milk samples. Pentachlorinated biphenyls were only detected in the range of 1%-2%. In the samples of wood and corresponding milk, a different PCB pattern appeared. There were remarkably high percentages of hepta- and octachlorinated biphenyls as well as a lower percentage of hexachlorinated biphenyls. The exact PCB content of milk, determined by the addition of all single components, proved to be approx. half the value obtained by the usual calculation based on the evaluation of the three main peaks of the technical PCB mixture (Clophen A60.). During 1984-1987, 607 samples of raw milk were analysed for six single PCB components, for which legal tolerance levels became valid in 1988. As a result, the lack of tri- and tetrachlorinated biphenyls in milk was confirmed, as well as the low, often not detectable content of pentachlorinated biphenyls. The German laws regarding PCB are discussed. AS

626 Wolfschoon Pombo (AF) and Moreira Furtado (MA). Detection of adulteration of pasteurised milk with whey by determination of the casein-bound phosphorus and protein-nitrogen content. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 188(1); 1989; 16-21

A new method to detect the adulteration of pasteurised milk with whey is described. The method is based on the detn. of casein-bound-phosphorus and the protein nitrogen content in milk. By using a mean casein content (0.85gP/100 g casein), a Kjeldahl factor of 6.34 and protein-N, the relative casein-N content (casein N/protein-N x 100) can be estimated. Over a period of one yr the variation in the phosphorus factor of dried skimmed milk samples amounted to 2.9%. In order to calculate the percentage of added whey, a standard curve has been prepared in which the relative casein content is plotted against the corresponding whey percentage. The results of 26 analyses on genuine pasteurised milk (casein bound P 21.7 mg/100 ml; casein N/protein N = 80.9%) and on 25 whey samples were used for the standard curve. In lab.-made blends of pasteurised milk and cheese whey(5%, 10%, 20%, and 30%), the estimated percentage of whey varied between -1.2% and +2.9% from the actual value. The analysis of nine samples from the Brazilian market showed that four samples were clearly adulterated with cheese whey. Sweet and/or acid whey addition will be detected by the proposed method. AS

Milk products

Cheese

627 Chen (J-P). Clarification of cheese whey by aqueous two-phase system. Journal of Food Science 54(5); 1989; 1369-1370

Aqueous two-phase systems comprising a pair of a polymer and a salt were investigated as a means to clarify Cheddar cheese whey. Fat in cheese whey could partition exclusively into the bottom phase of a polyethylene glycol/potassium dihydrogen sulphate aqueous two-phase system, resulting in a clear top phase containing whey proteins. Several parameters have been studied to optimize the recovery of whey proteins in such a system. Decreasing solute concn. to 11.7% polyethylene glycol/10% potassium dihydrogen phosphate lowering pH to 3.8, and lowering temp. to 7 C all contributed to enhance the yield. This method should be able to remove Ca. 98% fat in Cheddar cheese whey and to recover > 90% whey proteins. AS

628 Quehl (A), Engst (W), Ruttloff (H), Leuchtenberger (A) and Erhardt (V). Production of cheese flavour concentrate with special reference to the type "Roquefort" using the fermentation technique. Part 2. Testing of different factors in shaking culture. Nahrung 33(1); 1989;

43-50 (De).

Results of optimization exp. with the aim of aroma production by Penicillium roqueforti in shaking culture are discussed. The exp. concern the selection of suitable microorganisms, the precultivation for the production of an active inucolum as well as the optimization of the medium compounds in the main culture using statistical methods of planning and estimation. AS

Kheech

629 Sankhla (AK), Aarti Sankhla, Yadav (RK), Rao (DV), and Bhatnagar (S). Kheech. An indigenous milk product of Rajasthan. Indian Dairyman 42(1); 1990; 15-16

Kheech is a wheat based milk product prepared in Rajasthan State (India) by boiling debraned gelatinized wheat in milk with addition of sugar or jaggery. The product was prepared at the lab. by adding measured ingredients and was tested by sensory evaluation. The product when stored in refrigerator was acceptable upto 13 days and those stored at room temp. for 6 days. The product prepared with jaggery contained 29.25% total solids, 3.9% protein, 4.7% fat and 1.4% ash. KAR

Milk powder

630 Madkour (MAM) and Moussa (BMI). The determination of milk powder added to whole milk. Nahrung 33(1); 1989; 77-82

The objective of this investigation was to determine the adulteration of fresh milk with reconstituted full fat milk powder. The ultra violet and visible spectra (700 to 240 nm) indicated two empirical parameters which are used to detect and quantify adulteration. Each parameter was calibrated against standards of adulteration and then tested against samples of known adulteration. One parameter, tested against two known series (5, 10, 20, 40 and 80% adulteration) gave the best correlation (coeff. of variation, 2.9%) between 20 and 60% adulteration. Correlation decrased at 80% adulteration (coeff. of variation 6.7%) and at 0 to 20% adulteration (coeff. of variation 35.9%). The second parameter, used in the range of 0 to 10% adulteration, when tested against 14 known samples gave results with an average of 12.5% below the true values. Sensitivity was 2.5% added reconstituted milk powder. The effect of low fat values (less than 2.3%) is discussed and a correction factor derived. The method when tested against 12 known samples gave the correct results in all cases within the limitation of the method; 4 commercial samples of milk were also analyzed. AS

MEAT AND POULTRY

Meat

Beef

631 Dudasova (S), Sorman (L) and Dudas (J). Studies into the changes in sulphur amino acids of beef exposed to different time and temperature conditions. Acta Alimentaria 17(3); 1988; 205-210

The present paper deals with the influence of time and temp. combinations during sterilization of beef in its own juice within the range of 75-135 C and 5-95 min on the losses of sulphur amino acids studied as the loss of the total, protein and non-protein -SH groups. Experimentally obtained losses varied from 0.75% to 29.01%, 12.30% to 44.84% and from 0.32% to 28.71% for total, non-protein and protein-SH groups, resp. Regression equations were obtained for the losses using the two-factor plan for experiment. AS

632 Lunt (DK), Smith (GC), Savell (JW), Cross (HR) and Smith (SB). Ether-extractable fat in longissimus muscles from beef carcasses with the same marbling scores but different yield grades. Journal of Food Science 54(5); 1989; 1364-1366

Bovines

633 King (JDe Pablo (S) and Montes De Oca (F). Evaluation of gelation and solubility of bovine plasma protein isolates. Journal of Food Science 54(5); 1989; 1381-1382

Mutton

Lamb

634 Carballo (J), Jimenez-Colmenero (F) and Garcia Matamoros (F). Influence of low voltage electrical stimulation and rate of chilling on the characteristics of lamb meat. Revista de Agroquimica y Tecnologia de Alimentos 28(3); 1988; 430-440 (Es).

The effect of electrical stimulation at 56 V effective voltage while reversing polarity and the effect of the rate of chilling on the microbiological, colour, and texture characteristics of "merino-entrefino" lamb were studied. On the experimental conditions quick-chilling of the lamb carcasses gave raise to the critical pH and temp. values leading to cold-shortening. These critical values did not arise when electrical stimulation (even with quick-chilling) or a slower rate of chilling was applied. Microbial growth was dependent upon the rate of chilling but was not related to electrical stimulation. Electrical stimulation exerted an effect on meat colour for only a short post-mortem period and disappeared after three days in storage. Shearing strength decreased over the storage period, although the level depended upon both the rate of chilling and electrical stimulation, such that similar levels of this parameter were found for electrical stimulation and the slow rate of chilling. AS

635 Roncales (P), Beltran (JA), Jaime (I) and Lopez-Lorenzo (P). A simple method for following postmortem ATP depletion in lamb muscle. Journal of Food Science 54(5); 1989; 1365-1366

Relationship between adenosine 5'-triphosphate (ATP) concn. and R-value, defined as the absorption ratio of the degradation derivatives inosine 5'-monophosphate (IMP), inosine and hypoxanthine (E_{250}) to adenosine nucleotides (E_{260}), was studied in postmortem lamb Longissimus dorsi, until onset of rigor mortis, at different temp. of muscle storage and lamb carcass wt. Results showed a high overall correlation coeff. (r = -0.960), non-dependent of storage temp. or carcass wt. Thus, postmortem ATP concn. can be indirectly calculated through a simple, rapid, economic and reliable method such as R-value measurements. AS

Pork

636 Szczawinski (J), Szczawinska (M) and Szulc (M). Effect of irradiation on antibotulinal efficacy of nitrite. Journal of Food Science 54(5); 1989; 1313-1317

Ground pork meat was cured with the addition of 0, 50, 100, 156, and 200 mg/kg sodium nitrite, pasteurized and irradiated with 0, 3, 6, 9, 10, 20, 30, 40, and 50 kGy. After irradiation the samples were inoculated with a mixture of Clostridium botulinum type A, B and E spores, incubated at 30 C for 28 days and tested for the presence of botulinal toxin. Doses up to 9 kGy caused a decrease of sodium nitrite content with a corresponding decrease in antibotulinal activity. High irradiation doses resulted in a dose-dependent decrease in nitrite content with complete loss of antibotulinal activity. AS

Poultry

637 Bhat (GA). Problems of marketing poultry and poultry products. Poultry Guide 27(3); 1990; 37-41

A brief resume of problems encountered in marketing of poultry and poultry products in India. The author explains the performance of two private sector organisations (NECC and Agro Corpex) who deal with marketing of eggs. Explains the consumption pattern of eggs and poultry meat in India and stresses the need for establishing a rural marketing network, and popularising egg consumption through campaigning for balanced diet, providing in govt. sponsored mid-day meal for school children, feeding to expectant mothers, supplying to armed forces, hospitals and hotels. Some problems which are specific to India are the seasonal fluctuation of prices, lack of pre-grading system and poor market research and market intelligence. KAR

Chickens

638 Anand (SK), Mahapatra (CM), Pandey (NK) and Verma (SS). Microbial changes on chicken carcasses during processing. Indian Journal of Poultry Science 24(3); 1989; 203-209

Incidence of microorganisms on cage and floor reared live birds during different stages of processing of chickens was investigated. Changes in microbial counts of scald water, during scalding, defeathering, washing and chilling in slush ice in wash water were recorded. Heavy contamination by staphylococci and coliforms was observed during processing. Cage reared birds had lower bacterial counts than floor birds; faecal coliforms were completely absent in the former. Starving prior to slaughter and chilling reduced the microbial load on dressed carcasses. Defeathering of birds by a mechanical plucker increased, the contamination of carcasses. Bacterial counts in wash water and on washed carcasses gradually increased on continuous washing of birds in the same water. Chilling reduced the bacterial load of dressed carcasses. KAR

639 Anand (SK), Pandey (NK), Mahapatra (CM) and Verma (SS). Biochemical and enterotoxigenic characteristics of staphylococcal isolates in frozen chicken as affected by repeated freezing and thowing. Indian Journal of Poultry Science 24(3); 1989; 243-245

Chicken broilers were subjected to four freeze (-18 C) thaw (31 C) cycles and the Staphylococcal isolates were studied. All the Staphylococcal isolates from chicken broilers which were not subjected to freeze thaw cycles fermented mannitol anaerobically and produced catalase and were salt tolerant. Phosphatase and gelatinase were produced by 85 and 65% of the isolates resp. Coagulase and thermostable deoxyribonuclease was produced by 55 and 65% of the isolates. Enterotoxins were released by only 65% of the isolates. The biochemical characteristic of staphylococcal isolates did not change when the chicken broiler was subjected to repeated (4 times) free thaw cycles. KAR

640 Pertelsen (G), Finglas (PM), Loughridge (J), Faulks (RM) and Morgan (MRA). Investigation into the effects of conventional cooking on levels of thiamin (determined by HPLC) and pantothenic acid (determined by ELISA) in chicken. Food Sciences and Nutrition 42F(2); 1988; 83-96

The effect of conventional over-roasting of chicken on the levels of two vitamins, thiamin and pantothenic acid, was investigated. Five chickens were dissected and one half of each bird was cooked individually at 190 C for 20, 30, 40, 45 and 55 min. Cooked breast and drumstick muscles were pooled at each time. The remaining halves were pooled to provide a raw control. Thiamin was determined by HPLC after conversion to thiochrome, and pantothenic acid by ELISA. Thiamin content of breast muscles was in good agreement with values given in McCance & Widdowson's. The comp. of foods' (Paul & Southgate, 1978) obtained by the manual thiochrome method, but drumstick values were two-fold higher. Pantothenate content of both muscles were 25% lower than previous data (Paul & Southgate, 1978) determined microbiologically. No trends were found in vitamin retention over the cooking range for either vitamin. Retentions at the optimum cooking time of 45 min gave values in good agreement with average retentions published previously (Paul & Southgate, 1978) for chicken of 81 and 96% for thiamin and pantothenate resp. Large cvs between birds were observed for thiamin (27%) and pantothenate (13%). Both the HPLC and ELISA procedures used in this study offer the potential for the more accurate assessment of vitamin losses during food processing but further work is required to simplify and improve existing extraction procedures. AS

Broilers

641 Jagannathan (N). Marketing of broilers. Poultry Guide 27(1); 1990; 39-44

A review of the marketing of broilers in India, covering aspects like the comp. of poultry meat produced in India, quantity of broiler meat produced and the cost per unit, the scope for reducing the prices of broiler meat and the causes for the present low market demand for broilers. KAR

642 Papa (CM) and Fletcher (DL). Effect of aging temperature on broiler breast meat. Poultry Science 67(8); 1988; 1147-1153

In three exp. using a total of 102 broilers, effects were evaluated of post-mortem aging temp. between 0 and 40 C on chicken breast muscles, Pectralis (P. major and P. minor). The first exp. analyzed the effects of temp. in muscles excised immediately post-mortem. Results of exp. I suggested max. sarcomere lengths at aging temp. of 16 C for both muscles. However, differences between lengths observed at 0 and 4 C were not significant for P. major, and at 0, 4, and 23 C for P. minor. Exp. 2 analyzed effects of 4 and 16-C aging temp. and indicated that the rates of increase of R values (ratio of inosine to adenine nucleotides) were neraly equal at 4 and 16 C when compared across each of the locations of P. major. Decreases in sarcomere lengths slowed at 16 C in anterior and middle sections of P. major, relative to lengths at 4 C. For the P.minor muscles, the increase of R values was more rapid at 16 C, whereas sarcomere shortening was slower in comparison with that observed at 4 C. In exp. 3, an attempt was made to apply 4 C. For the P. minor and 16-C aging temp. to schemes of early deboning at 3 h and 4 h post-mortem. No significant effects were observed of these temp. conditionings on sarcomere lengths of the raw muscles or on shear values of the cooked meat. Furthermore, neither scheme resulted in values P. major meat tenderness comparable with those resulting from aging the muscles intact on the carcass for 24 h. AS

Poultry products

Eggs

643 Singh (A) and Saxena (HK). Changes in unpreserved egg and methods of egg preservation. Poultry Guide 27(3); 1990; 27-32

The aspects dealt with under the changes occurring due to ageing of egg include physical and internal changes, the former includes the changes in egg wt., air cell size, sp. gr. and in the latter are included albumen, albumen index and yolk and yolk index. The chemical changes occurring in unpreserved egg (stored under high temp.) and the environment suitable for preserving egg have been described. Under whole egg preservation the aspects covered include refrigeration and cold storage; shell sealing method; oil application and flash heat treatment for egg protection. Also indicated the method of preserving opened eggs by freezing and drying. KAR

SEAFOODS

644 Stratham (J A) and Bremmer (HA). Shelf-life extension of packaged seafoods. A summary of a research approach. Food Technology in Australia 41(2); 1989; 614-620

A step-by-step experimental approach to achieve extension of shelf-life of seafoods is described. The techniques of modifying the properties of the flesh, using vacuum and modified atm. packaging and adding lactic acid bacteria or potassium sorbate were explored. Several of these techniques, alone or in combination, could achieve the aim of extending the shelf-life by suppressing the spoilage bacteria. For scallops, addition of potassium sorbate (1g/kg) and vacuum-packaging or packaging in carbon dioxide were effective techniques. For whitefish, packaging in carbon dioxide either with or without potassium sorbate was effective. Safety, the limits to shelf-life, and some of the commercial considerations are also discussed. AS

Shrimps

645 Anon. Packaging of shrimp for export. Packaging India 21(2); 1988; 17-23

In this report recommendations for packaging of frozen shrimps, standardisation of current packaging(code slip, glazing, primary wrap, unit cartons, master boxes (corrugated boxes), box closures, storage and ware housing, quality control, containerization and packaging costs), packaging developments (optimum glazing) and primary wrap eliminating the need for unit cartons are outlined. SRA

646 Takada (K), Aoki (T) and Kunisak (N). Proximate composition, free amino acids, fatty acid, mineral and cholesterol contents in imported frozen shrimps. Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 54(12); 1988; 2173-2179 (Ja).

A large quantity of shrimps are imported and consumed as many var. of dishes in Japan. Eighteen different species of imported shrimps were collected in the central wholesale fish market in Tokyo.

This study was undertaken to analyze the nutritive components. The results obtained are as follows. The contents of the edible portions of 18 species of shrimps were: 1) moisture, 72.8-81.9; crude protein, 16.4-22.6; lipid, 1.1-4.2; and ash, 0.7-3.4%. 2) The contents of free amino acid such as glycine, alanine and proline were higher than that of other amino acids. Amino acid which do not constitute protein such as sarcosine, beta-alanine, gamma-amino butylic acid, ethanolamine and carnosine were detected only in the Pandalidae family of shrimps and anseline was also detected only in zinkenebi (Plesionika edwardsi). 3) Contents of unsaturated fatty acid such C $_{18:1}$, $C_{20:1}$ and $C_{20:3}$ in Pandalidae family shrimp inhabit the cold current area and were higher than that of other family. 4) Contents of Na, K, and P were high for every kind of shrimp and Na contents varied greatly. Total cholesterol was in the range of 90-150 mg/100 g in the edible portion of the shrimps. AS

Fish

647 Ruales (J), Polit (P) and Nair (BM). Production and nutritional evaluation of some dehydrated food products based on deodourized fish flesh and maize. Food Sciences and Nutrition 42F(2); 1988; 97-109

A procedure for the production of deodourized fish flesh is described. The removal of fat by this process was 70% for both sp. Pnematophorus peruanus (mackerel) and Ophistonema libertate (pinchagua). The deodourized fish flesh was co-dried with maize flour. The drum-dried flesh product was used as meat extender, and in the preparation of dry soup mixes. The protein content of the fish flakes was 48.6%, and of the dry soup mix was 23.4%. The fat content of the fish flakes and of the dry soup mix was 2.2 and 24.9% resp. The chemical score of the protein, the limiting amino acid being valine, in the fish flakes and dry soup mix was 90 and 84, resp. The comp. of some minerals, Ca, Mg, Fe, Zn, and Cu for both samples and the nutrient density of the flakes and dry soup mix in relation to the recommended daily allowance for some essential nutrients and a commercial dry soup is discussed. AS

648 Saheki (K), Konno (K), Sato (T) and Kawabata (T). Decontamination of Salmonella from the coastal fish meals by ^{60}Co gamma ray irradiation. Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 54(12); 1988; 2107-2112 (Ja).

The decontamination of salmonellae from fish meal samples by irradiation which ^{60}Co gamma ray was examined. Sixteen strains of Salmonella were used. A composite fish meal sample was prepared by mixing with different coastal meals, and after radiation sterilization at a dose of 20 kGy ^{60}Co gamma ray, which was employed as the Salmonella-free meal sample. D_{10} values of test strains determined in buffered saline were found to range from 0.08 to 0.36 kGy, and inactivation factors at a dose of 1 kGy ranged from 10 to 10. D_{10} values of test strains determined in the Salmonella-free meal sample ranged from 0.59 to 1.64 kGy, and the inactivatiofnf actors at a dose of 10 kGy were found to range form $10^{6.1}$ to 10^{17} Interestingly the D_{10} values of salmonellae determined in fish meal samples were

10 times as much compared with those determined in buffered saline. From the commercial aspects of coastal fish meal production, destruction of salmonellae in fish meals by ^{60}CO gamma ray irradiation was found to be much more practical than other methods such as dry heating and ethylene oxide fumigation. AS

Anchovies

649 Castanon (CA) and Barral (AO). Effective thermal diffusivity in salted-matured anchovy (Engraulis anchoita) based paste. Revista de Agroquimica y Tecnologia de Alimentos 28(3); 1988; 441-445 (Es).

The effective thermal diffusivity in salted matured anchovy (Engraulis anchoita) spreading paste is duly determined in order to apply the results to industrial calculations. The method utilized is the one proposed by Olson and Jackson in 1942. Fourteen heating and seven cooling tests were preformed with the following average values for thermal diffusivity: for heating tests 1.42. 10^{-7} m^2 S^{-1}, with a standard deviation of 0.05. 10^{-7} m^2 S^{-1} ; for cooling ones 1.64. 10^{-7} m^2 S^{-1}, with a standard deviation of 0.14. 10^{-7} m^2 S^{-1}. Experimental results are compared to thermal diffusivity values calculated from predictive equations of thermal diffusivity in foodstuffs. AS

Fish oils

650 Karahadian (C) and Lindsay (RC). Action of tocopherol-type compounds in directing reactions farming flavour compounds in autoxidizing fish oils. Journal of the American Oil Chemists" Society 66(9); 1989; 1302-1308

Menhaden and cod liver oils without additives or containing either alpha-tocopherol (670 p.p.m.) or Trolox C (1000 p.p.m.) with or without copper (II) cations (20 p.p.m.) were oxidized under air at 65 C, and their headspace volatiles were quantitatively measured by capillary gas chromatography. Samples prepared without additives contained very little 1,5-octadien-3-one. Fish oils with Trolox C had distinct metallic, vinyl-ketone aromas, while those with alpha-tocopherol exhibited extremely fishy, cod liver-like aromas. High levels of 1,5-octadien-3-one and 1,5-octadien-3-ol and moderate levels of 2,4,7-decatrienals were found in samples with Trolox C, while moderate levels of the 8-carbon compounds and high levels of the 2,4,7-decatrienals were present in the alpha-tocopherol samples. Copper (II) greatly accelerated the overall rate of oxidation in samples, and in the presence of Trolox C it induced the formation of very high levels of 1,5-octadien-3-ol. AS

Sardines

651 Ando (Y), Ota (T) and Takagi (T). Japanese sardine oil as a source of 16:3 (n-4) and 16:4 (n-1) fatty acids. Journal of the American Oil Chemists" Society 66(9); 1989; 1323-1325

Open tubular gas liquid chromatographic (GLC) analysis of fatty acids in Japanese sardine oil showed the contents of 1.57% hexadecatrienoic acid (16:3) and 2.55% hexadecatetraenoic acid (16:4). Concn. of 16:3 and 16:4 were carried out through the urea adduct method, argentation thin layer chromatography (TLC) and reversed phase TLC, with the purities of 16:3 and 16:4 samples obtained being both higher than 92%. They were recognized as 16:3(n-4) and 16:4(n-1) by nuclear magnetic resonance analyses of the methyl esters and GLC analyses of the partially hydrazine hydrogenated products and their oxidative ozonolysis products. The structures were supported by the results of gas chromatographic-mass spectrometric analyses of the pyrrolidides. Other isomers of 16:3 and 16:4 have not been detected in the GLC analysis of the methyl esters. These results indicate that sardine oil is useful as a source of these fatty acids. AS

652 Koisumi (C), Chang (C-M), Ohshima (T) and Wada (S). Influence of freeze-thawing process on the quality of sardine and horse mackerel during refrigerated storage. Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 54(12); 1988; 2203-2210 (Ja).

In order to obtain information concerning influence of freeze-thawing process on the quality of fish during refrigerated storage, fresh round sardine and horse mackerel were frozen at -20 C and subsequently stored at the same temp. for 35 days. After thawing in water, the fish was stored in a refrigerator of about 5 C for 8 days. During storage, VBN content, K value, TBA value, lipid class comp. and fatty acid comp. were determined at an appropriate interval and compared with those of the unfrozen fish which was stored under the same appropriate interval and compared with those of the unfrozen fish which was stored under the same refrigerated conditions. As a result, it became clear that freeze-thawing process accelerates 1) deterioration of freshness in horse mackerel but not in sardine and 2) enzymatic hydrolysis of lipids in sardine and both hydrolysis and oxidation of lipids in horse mackerel during refrigerated storage. From these results, it was assumed that disruption of membranes and other tissue structure of the fish flesh due to freeze-thawing process results in acceleration of various reactions involved in the deteriorations of both freshness and lipids during refrigerated storage. AS

Silver carps

653 Meith (G), Wirth (M), Friedrich (M), Stefens (W) and Lieder (U). Lipid composition of cyprinidae species. Part I. Lipid content and fatty acid pattern of silver carps (Hypophthalmichthys molitrix Vol.). Nahrung 33(1); 1989; 91-93 (De).

Products

Fish sausage

654 Satomi (K), Sasak (A) and Yokoyama (M). Inhibition of lipid oxidation in fish sausage prepared from sardine meat. Bulletin of the Japanese

Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 54(2); 1988; 2211-2215 (Ja).

Attempts were made to inhibit the lipid oxidation in the fish sausage prepared from sardine meat. The fish sausage was prepared from 100% sardine meat or from mixed meat of 24% sardine and 76% surimi of Alaska pollack, and was pacakaged in a casing made from polyvinylidene chloride (PVDC) or polyethylene terephthalate/aluminium foli/polypropylen (PET/AI/PP). These sausage were stored at 30 C in darkness for 30 days and the oxidative deterioration of the sausage was examined by measuring TBA value and flavour score. Casing by PET/AI/PP film was the most effective to inhibit the lipid oxidation compared with casing by PVDC flim. Also the oxidative deterioration of 100% sardine meat sausage was more remarkable than mixed sardine meat sausage. Addition of sodium nitrate or sodium nitrate plus sodium ascorbate was effective to inhibit the oxidation in sausage. When the sausage was prepared from mixed meat with addition of 100 p.p.m. sodium nitrate plus 1,000 p.p.m. sodium ascorbate and with PVDC casing, no appreciable oxidative deterioration was detected even after 30 days storage at 30 C. On the other hand, in the sausage prepared from 100% sardine meat, the lipid oxidation of the sausage had proceeded to an appreciable level even before starting storage, though PET/AI/PP caring was used. The possible mechanism of lipid oxidation in fish meat sausage in the processing steps such as transportation process of harvested sardine, emulsion making and stuffing process, and heat processing in a retort was discussed. AS

PROTEIN FOODS

Nil

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Alcoholic beverages

Brandy

655 Bellanato (J) and Bravo-Abad (F). Analysis of brandy components by infrared spectroscopy. Revista de Agroquimica y Tecnologia de Alimentos 28(3); 1988; 379-394 (Es).

Infrared spectroscopy has been used to determine the major components of vacuum extracts, ash and evaporated bencenic extracts of a series of Spanish brandies (from Andalusia and Cataloni) and French cognacs. This work is a previous part of a wider infrared study on the aging process of wine spirits and genuine Spanish brandies. Main bulk comp. of brandy dry extracts has been found to consist of monosaccharides (fructose and glucose) mineral salts, higher alcohols and carbonyl derivatives. The main constituents of ashes, obtained at 520 C, and calcium, potassium and sodium sulphates and phosphates. The evaporated bencenic extracts consist of higher esters and aldehydes (mainly 5-(hydroxymethyl)-2-furfuraldehyde). Infrared spectra reveal qualitative and quantitative differentes in the chemical comp. of brandy. As a first approximation, the results obtained can be related to "price index" and/or "commercial quality". Infrared data have been complemented by conventional analytical measurements. AS

Litchi drink

656 Vyas (KK), Sharma (RC) and Joshi (VK). High flavoured low alcoholic litchi drink. Beverage & Food World 16(1); 1989; 30

The preparation of litchi drink is described in this paper. SRA

Whiskies

657 Headley (LM) and Hardy (JK). Classification of whiskies by principal component analysis.' Journal of Food Science 54(5); 1989; 1351-1354, 1358

Trace components in forty-eight samples in five whiskey categories were extracted into methylene chloride, concentrated and separated by capillary column gas chromatography. The technique of principal component analysis was applied to the peaks in the resulting gas chromatograms and the samples formed clusters according to category. Further studies showed that variation in sample comp. due to dilution, blending, or contamination using a model contaminant could be detected with good sensitivity. AS

Wines

658 Degre (R), Thomas (DY), Ash (J), Mailmt (K), Morin (A) and Dubord (C). Wine yeast strain identification. American Journal of Enology and Viticulture 40(4); 1989; 309-315

Commercially produced strains of wine yeast are being widely accepted in the wine industry, and many new strains are finding their way into the market. However, most of the strains belong to the Saccharomyces cerevisiae group and cannot be readily distinguished and identified by classical biochemical methods. We have, therefore, developed a series of tests to identify and characterize yeast strains including rapid biochemical methods, killer profile, protein electrophoresis profile, volatile fatty acids profile, chromosome electrophoresis, and DNA finger printing. We applied these techniques to several commercially available wine yeast strains (Prise de Mousse) used for the production of sparking wines and found them to be different. Therefore they have the potential to impart different characters to wines. AS

659 Dozen (NM) and Noble (AC). Sensory study of the Ebbert of fluorescent light on a sparkling wine and its base wine. American Journal of

Enology and Viticulture 40(4); 1989; 265-271

The effect of exposure of fluorescent light on sparkling wine and the still wine from which it was made was studied in green and flint (clear) bottles. Although the green glass afforded some protection against the light, a significant difference in aroma was produced after 18 h and 31.1 h of exposure, resp., in the still and the sparkling wines. In flint glass, significant differences in aroma were produced after 33.4 h and 3.3 h, resp., in the still and the sparkling wines. Because of the extreme light sensitivity of white wine bottled in clear glass, serious consideration should be paid to using UV-screening agents in clear glass or to switching to green or brown glass. The lightstruck aroma (gouts de lumiere) produced on exposure of still and sparkling wines to fluorescent light was characterized by descriptive analysis. With increased time of exposure, a decrease in citrus aroma intensity occurred, while the intensity of cooked cabbage, corn nuts, wet dog/wet wool, and soy/marmite aromas increased. AS

660 Etievant (P), Schlich (P), Cantagrel (R), Bertrand (A) and Bouvier (J-C). Varietal and geographic classification of French red wines in terms of major acids. Journal of the Science of Food and Agriculture 46(4); 1989; 421-438

661 Heymann (H) and Noble (AC). Comparison of canonical variate and principal component analyses of wine descriptive analysis data. Journal of Food Science 54(5); 1989; 1355-1358

Cabernet Sauvignon wines from four regions and Chardonnay wines from three vintages were evaluated by descriptive analysis. The sensory ratings were evaluated by principal component analysis (PCA) and by canonical variate analysis (CVA) using wines (CVA-Wine) and using regions or vintages (CVA-Group) as classification variables. PCA and CVA-Wine analyses provides similar results for both data sets. Whereas, the CVA-Groups analyses demonstrated significant differences among regions or vintages, the variable configuration differed from the other two methods, reflecting the differences among groups rather than among the wines overall. To understand the structure of the data, CVA-Wine and PCA tests were superior to CVA-Group. AS

662 Kelley (WJ), Asmudson (RV) and Hopcroft (DH). Growths of Leuconostoc oenos under anaerobic conditions. American Journal of Enology and Viticulture 40(4); 1989; 277-282

Malolactic fermentation acts to reduce acidity levels in wine and is most commonly initiated by the lactic acid bacterium Leuconostoc oenos. We examined the growth of reference of strains and New Zealand isolates of L. oenos using pre-reduced broth and agar media, and found that anaerobic conditions facilitated the growth of this organism, especially on agar plates. Growth did not appear to be stimulated specifically by carbon dioxide. Anaerobic media were used to examine the temp. optima and carbohydrate utilization patterns of L. oenos strains. These tests demonstrated that there was considerable heterogeneity among strains of L. oenos. AS

663 Magyar (I) and Panyik (I). Biological deacidification of wine with Schizosaccharomyces pombe entrapped in ca-alginate gel. American Journal of Enology and Viticulture 40(4); 1989; 232-240

Schizosaccharomyces pombe cells were immobilized in a spherical ca-alginate gel and were examined for application in red wine production. Malic acid degredation by Schiz. pombe was found not be be fully coupled to glucose fermentation. This biocatalyst was found to be suitable for deacidification of red musts and partially fermented red wine. Neither Schiz. pombe nor the alginate support system exerted undesirable effects on wine quality. Although this method is not a perfect alternative to malolactic fermentation, it can improve the acid harmony of wines with high acidity. AS

664 Ogbonna (JC), Amam (Y), Nakamura (K), Yoktsuko (K), Simazu (Y), Watanabe (M) and Hara (S). A multistage bioreactor with replaceable bioplates for continuous wine fermentation. American Journal of Enology and Viticulture 40(4); 1989; 292-298

A horizontal multistage bioreactor with replaceable immobilized plates (bioplates) was constructed for continuous wine fermentation. The bioplates were prepared by immobilizing viable cells in the form of membranes onto sintered glass plates, using calcium alginate as the carrier. Five bioplates were inserted vertically along a rectangular frame constructed from acryllic sheets, thus separating it into six compartments. The residence time distribution curve of the bioreactor approx. that of the six tanks in a series model (j = 5.61). The bioreactor was used for the continuous fermentation of Koshu grape must. During the steady state axial sugar and ethanol concn. gradients existed from the first to the last compartment. The steady state was maintained for more than 42 days. Also, application of this bioreactor for continuous wine fermentation with simultaneous deacidification of a Muscat Bailey A grape must was carried out. Two bioplates of Schizosaccharomyces pombe 0-77 and five bioplates of Saccharomyces cerevisiae 2HY-1 were used to separate the reactor into eight compartments. In this system, the total acidity of the wine during the steady state was reduced by 17% to 38% and the L-malic acid concn. by 58% to 76%. The L-lactic acid concn. remained more or less constant throughout the process. AS

665 Sims (CA), Johnson (RP) and Bates (RP). Quality of a non-sulphited Vitis rotundifolia and a Euvitis hybrid white wine produced from ultrafiltered juice. American Journal of Enology and Viticulture 40(4); 1989; 272-276

Juice from a white Vitis rotundifolia and a white Euvitis hybrid was ultrafiltered (UF) through a 30 000 MWCO membrane and made into wine without added sulphur dioxide. The UF Euvitis hybrid wine was slightly lighter in colour and had a poorer aroma ranking than wine made with sulphur dioxide, but the opposite was true for the V. rotundifolia wine. The UF wines were ranked equal in taste to the traditional sulphur dioxide wines and had better colour stability than wines made without sulphur dioxide. Wines made without sulphur dioxide produced the lowest rankings in aroma and taste and were much darker. AS

666 Trioli (G) and Ough (CS). Causes for inhibition of an acid urease from Lactobacillus fermentus. American Journal of Enology and Viticulture 40(4); 1989; 245-252

The acid urease from Lactobacillus fermentum was found to be inhibited to a minor degree Cu++, Fe+++, Ca++, phosphate, phenolic compounds, sulphur dioxide, and ethanol. Significant inhibition was found from L-malic acid, L-lactic acid, D-lactic acid, pyruvic acid, alpha-ketoglutaric acid, and acetic acid. No inhibition was noted from tartaric acid or succinic acid. The efficiency varied greatly from wine to wine. The enzyme was shown to be extremely durable and capable of operating for extended lengths of time in wine without negative effect on the efficiency. A doubling in rate occurrs with each 10 C rise in incubation temp. It is very effective in pH 3.0 to 4.0 range, without inhibitors present. AS

Non-alcoholic beverages

Fruit juices

Apple juices

667 Padilla (OI) and McLellan (MR). Molecular weight cut-off of ultrafiltration membranes and the quality and stability of apple juice. Journal of Food Science 54(5); 1989; 1250-1254

The quality and stability of apple juice clarified using 10,000 (10K) 50K, 100K, and 500K daltons mol. wt. cut-off (MWCO) hollow fiber membranes were examined. Ultrafiltered juice was tested for initial stability, starch presence, pH, total acidity, total solids, soluble solids, turbidity, browning, Hunter colour, total phenols, and sensory attributes. Turbidity, browning, total phenols, and sensory colour were different depending upon the MWCO used. Samples were stored at 18 C and 43 C for 6 months and evaluated monthly. At 18 C, there were no significant changes but initial differences due to membranes remained. At 43 C, the increase in turbidity, browning and chroma, as well as the decrease in lightness and hue with time, were significant. Reaction rates were all the same independent of the MWCO except for chroma. AS

668 Pool (L). The effect of pulp holding time on the volatile components in apple juice (with and without pectolytic enzyme treatment). Lebensmittel-Wissenschaft und-Technologie 21(2); 1988; 87-91

The results of this study showed that natural enzymes present in apple tissue are active and alter the concn. of organoleptically important aroma compounds during the pulp holding time. The apple juice pressed after 0-15 min. the pulp holding time is different from the juice pressed after 4-8 h holding times. These juices have different aroma values, which possibly could influence the organoleptics of the juices. In exp. conducted apples were crushed into pulp and held for 0, 15, 30, 60, 240 and 480 min. before making it to juice. The concn. of the volatiles in the juice from each pulp holding time was determined. The results are the concn. of C-6 aldehydes and the acetate esters decreased during the pulp holding time and after 8 h only 10-25% of the initial concn. was remaining. If peptolitic enzymes were added to the pulp only small differences were observed between the enzyme treated and untreated samples. SRA

669 Wald (B) and Galensa (R). Detection of adulteration of apple juice and pear juice. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 188(2); 1989; 107-114 (De).

A method has been developed to detect the adulteration of pear juice with apples and apple juice with pears. In different var. of apples and pears and in several commercial juices the flavonoids were examined by HPLC with respect to their quality and quantity. The chalcones phloretin glucoside and phloretin xyloglucoside are typical compounds found in apples (detection limit 7 ng). They are suitable indicators for detecting adulteration of pear juice with apples. Isohamnetin glucoside cannot be detected in apples (detection limit 10 ng), but can be used to detect pears in apple juice. The extract or juice was purified with the aid of a polyamide column. The evaporated eluate of methanol was analysed by HPLC gradient:acetonitrile/1% acetic acid). An RP 18 column and a UV-detector were used. Additionally, the UV spectra of the compounds indicating an adulteration were recorded by a diode array detector. AS

Grape juices

670 Bissell (P), Ewart (A) and Sangtippawan (W). Loading concentrations for tartaric and malic acid for single column HPLC organic acid analysis. American Journal of Enology and Viticulture 40(4); 1989; 316-319

The linearity of detection of tartaric and malic acids in grape juice was investigated for a single Aminex HPX 87H organic acid analysis column system. High levels of tartaric and malic acid resulted in a major drop in per cent recovery. Using external standard calibration, based on peak height integration, the upper limits for column loading of grape juice samples were found to be 10 µg for tartaric acid and 30 ug for malic acid, above which recoveries dropped below 95%. A similar result was found using a synthetic juice containing glucose, fructose, and the two acids. Aqueous solutions of acids were found to be linear up to 25 ug tartaric acid and 130 ug malic acid. The reason for the drop in recovery under high acid conditions was not identified. Routine grape juice analysis required dilution of 1:10 to 1:20 to ensure accurate recoveries. AS

Orange juices

671 Mottar (J). The usefulness of polypropylene for the aseptic packaging of orange juices. Zeitschrift fur Lebensmittel-Untersuchung und -For-

schung 189(2); 1989; 119-122

The usefulness of co-extruded polypropylene packages for the aseptic packaging or orange juice was investigated. From the results, it appeared that this material may offer a good alternative for the aseptic packaging of fruit juices. A comparable physicochemical and organoleptic storage behaviour was found when using cartons lined with aluminium foil. An acceptable quality may be guaranteed for at leat 3 months at storage temp. of up to 20 C. Co-extruded polypropylene can reduce costs and may be used in plants employing a rationalized form fill-seal packaging procedure. AS

672 Sauri (E), Nadal (MI) and Izquierdo (L). Isolation of the volatile fraction of orange juice by solvent extraction or nitrogen stripping. Quantitative study using model juices Revista de Agroquimica y Tecnologia de Alimentos 28(3); 1988; 370-378 (Es).

Two methods of isolating the volatile constituents (model solutions) of orange juice for gas-chromatographic analysis were studied: direct extraction from the juice using a low boiling point solvent (methylene chloride) and nitrogen stripping followed by bubbling of the nitrogen flow in a high boiling point solvent (dimethylformamide) to retain the volatile constituents. Continuous extraction with methylene chloride is easy, requires little attention, and produces generally high extraction yields. Consequently, this method can be conidered as a suitable alternative to vacuum distillation. Nitrogen stripping and retention in dimethylformamide allows the quantification of those low boiling point constituents which cannot be analyzed by gas chromatography through methylene chloride extraction, as they are lost when the solvent is removed or masked by the solvent peak. AS

Oranges juices

673 Velez (C), Costell (E), Izquierdo (L) and Duran (L). Changes in orange juice aroma during storage. Sensorial analysis using multidimensional scaling. Revista de Agroquimica y Tecnologia de Alimentos 28(3); 1988; 421-428 (Es).

Aroma changes of aseptically packed orange juice as affected by storage conditions were analysed using two sensorial approaches: evaluation of dissimilarities between samples and evaluation of aroma quality for each individual sample. Freshly squeezed juice from Valencia oranges was bottled under aseptic conditions. The bottles were grouped in 10 samples: one was frozen and stored at -18 C (reference sample) and the other were kept for 1, 2 or 3 months at each of three following storage temp. 0, 20 and 37 C. All possible different pairs of samples (45) were evaluated for aroma similarity and, separately, the judges scored the quality of the aroma of each juice. Dissimilarity matrix was studied by multidimensional scaling (MDS) and mean scores of aroma quality assessments were studied by analysis of variance applied to aroma quality data informed on the pattern of loss of quality during storage and on the quality level at any of the storage periods. AS

Strawberry juices

674 Lundahl (DS), McDaniel (MR) and Wrolstad (RE). Flavour, aroma, and composition changes in strawberry juice concentrate stored at 20 C. Journal of Food Science 54(5); 1989; 1255-1258

Strawberry juice conc. (68 Brix) was stored at 20 C for 0-6 days. Samples were analyzed for changes in taste, aroma and colour degradation, and these changes were related to comp. change. Astringent taste, musty/moldy and pungent aromas and brown colour developed rapidly over 6 days. This decrease in quality was accompained by carbon dioxide production and a decrease in free amino acids, while reducing sugar and titratable acidity concn. remained stable. AS

Groundnut beverages

675 Chompreeda (P), Haruthaithanasan (V), Oupadissakoon (C) and Suknak (K). Development of a chocolate flavoured peanut beverage. Journal of Food Science 54(5); 1989; 1359-1360

Nine chocolate-flavoured peanut beverages (CFPB) were prepared using peanut protein isolate as source of protein and analyzed for physical, microbiological-sensory qualities. The quality attributes such as colour, aroma, viscosity, and flavour of CFPB were similar to that of commercial chocolate milk. The total aerobic populations of the beverage before and after refrigeration for 7 days were less than 10 and 200 colonies/g, resp., and no coliform bacteria was detected in this product. Sensory evaluation and response surface methodology indicated that optimum formulation of CFPB was obtained by using 3.5% protein (from peanut protein isolate), 3.5% butter, 8% sugar, 0.7% cocoa powder, 0.1% stabilizer, and water. Consumer study of the CFPB revealed that all sensory characteristics were acceptable in the range of like to extremely like. AS

Tea

676 Biedrich (P), Engelhardt (UH) and Herzig (B). Determination of quercetin-3-O-rutinoside in black tea by HPLC. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 189(2); 1989; 149-150 (De).

Flavonol glycosides were isolated from black tea by column chromatography with polyamide. ARP-HPLC method with gradient elution (solvent A: 2% acetic acid; solvent B: acetonitrile) was used for the separation of the flavonol glycosides. Identification was carried out by UV spectra using a diode-array detector. Among these compounds rutoside is of special interest because of its physiological activity. The amounts in black tea were 86 to 214 mg/100g, if extracted with hot water only. AS

677 Mahanta (PK) and Baruah (S). Relationship between process of withering and aroma characteristics of black tea. Journal of the Science of Food and Agriculture 46(4); 1989; 461-468

The changes in volatile flavour compounds (VFC), crude fiber, caffeine, ash, total water soluble solids (TSS) in orthodox and CTC, black teas during withering of tea leaves have been studied and results presented in this paper. It was found that with the increase of withering VFC, TSS and caffeine were found to increase but crude fibre remained constant. It was also seen that the withering process during black tea manufacture was responsible for the development of terpenoids and improvement in the flavour quality in brewed tea. NGKR

678 Robertson (A) and Hall (MN). A critical investigation into the flavognost method for theaflavin analysis in black tea. Food Chemistry 34(1); 1989; 57-70

There are several critical stages in the Flavognost method for theaflavin analysis in black tea. These have been identified and their significance determined experimentally. During sample preparation, the particle size of the ground material, and the type of grinder used to produce it, directly influence the level of extracted theaflavin. The temp. of the water used and the time over which infusion is carried out are also very significant as is the method of shaking. Failure to control conditions at these critical stages can give rise to a fourfold variation in results. Recommendations are given for possible incorporation into standard protocols. AS

FATS AND OILS

Fats

679 Silroy (S) and Bhattacharyya (DK). Cooling curve characteristics of some interesterified fats, hydrogenated fats and their blends. Journal of the Oil Technologists" Association of India 21(2); 1989; 31-33

Cooling curve characteristics of interesterified fat products, hydrogenated fats of oils of soybean, rice bran, mahua, cottonseed and rapeseed and blends of hydrogenated fats and their esterified fats were determined. A distinct super cooling point and solidification point and also a characteristic raise in temp. was observed in the hydrogenated fat. Depending upon the bath temp. super cooling and solidification points and also the raise in the temp. of each hydrogenated fat show variation in pattern. Interesterified fats neither show any super cooling point nor solidification point. The distinct difference in the cooling curve characteristics between the interesterified fats and hydrogenated fats could be used to distinguish between the two when they have similar melting point. When blends of interesterified and hydrogenated fats were prepared in different proportions they could be readily detected by distinct rise in temp. contributed by the hydrogenated fat. KAR

Oils

680 Saidia (B) and Hammand (E). Quantitation of carbonyl produced by the decomposition of hydroperoxides. Journal of the American Oil Chem-

ists" Society 66(8); 1989; 1097-1101

Carbonyl produced by the decomposition of hydroperoxides of polyunsaturated fatty acids and their methyl esters were determined by GC of the 2,4,6-trichloro methyl hydrozones. The effect of temp., trace metals, ethanol and antioxidants on the rate of decomposition was studied. MNK

Mustard oils

681 Rao (KVSA), Paulose (MM) and Lakshminarayana (G). Saturation and geometrical isomerisation of unsaturated fatty acids during hydrogenation of mustard oil. Journal of the Oil Technologists" Association of India 21(2); 1989; 24-25

Refined, bleached and deodourised Indian mustard oil having an Iodine value (IV) of 107.4 and erucic acid content of 47.8% was hydrolysed at 180 C and 30 psig pressure using 0.25% commercial nickel catalyst equivalent to 0.05% Ni in oil basis. Four hydrogenated oil samples of the above mustard oil had an IV range of 64.7 to 75%. Fatty acid comp. showed that stearic acid (18:0) increased from 1 to 6.8% and behenic acid (22:0) from 2.2 to 10.3% on hydrogenation when IV fell to 64.7. Considerable extent of geometrical isomerisation of both C_{18} and C_{22} unsaturated fatty acids occurred. The trans fatty acid contents of 18:1 and 22:1 ranged from 11.8 to 16.0 and 22.2-26.2% resp. for the 4 samples. Significant difference was not noticed between C_{18} and C_{22} unsaturated fatty acids in the general pattern of saturation and geometrical isomerisation. KAR

Palm oils

682 Manorama (R), Harishankar (N), Polasa (K) and Rukmini (C). Mutagenicity studies on repeatedly heated crude and refined palm oil. Journal of the Oil Technologists" Association of India 21(2); 1989; 29-31

Groundnut oil, crude and refined palm oil were heated for 8, 16 and 24 h and mutagenicity test was done using Salmonella typhimurium TA 98 and TA 100. The frequency of revertants in S. typhimurium was similar when tested with heated (8, 16 and 24 h) palm oil and refined palm oil. Hence it is concluded that crude and refined palm oil can be used as frying medium as they are chemically stable and biologically safe even when heated to very high temp. KAR

683 Siew (WL) and Mohammad (Y). Effects of refining on chemical and physical properties of palm oil products. Journal of the American Oil Chemists" Society 66(8); 1989; 1116-1119

The effects of bleaching and deodourization on oxidative changes and possible isomerisation and interesterification of the fatty acids of palm oil were studied under lab. refining exp. Very little isomerisation occurred in commercial refined products as indicated by the level of trans acids, and changes in the triglyceride structures were insignificant. MNK

Soybean oils

684 Christopoulou (CN) and Perkins (EG). Isolation and characterization of dimers formed in used soybean oil. Journal of the American Oil Chemists" Society 66(9); 1989; 1360-1370

Dimers were isolated from two samples of partially hydrogenated soybean oil which had been used for frying. They were then separated into their component structures using an LC-18 octadecyl bonded, HPLC column with acetone-acetonitrile (1:1 v/v) as the mobile phase with refractometry as the mode of detection and identified by gas chromatography-mass spectrometry. Evidence is presented for the presence of the monohydroxy, dihydroxy, and keto-groups in the dimer of linoleic acid as well as the dehydrodimer, the bicyclic, the tricyclic, and the thermal dimer of methyl linoleate and the dehydrodimer of methyl oleate. AS

685 Dornobs (DLJr), Mullen (RE) and Hammand (EG). Phospholipids of environmentally stressed soybean seeds. Journal of the American Oil Chemists" Society 66(9); 1989; 1371-1373

Sunflower oils

686 Zsinka (JN), Foldes (V), Gere (A), Sze pvolgyi (J), Peredi (J) and Thuroczy-Thiermayer (T). Influence of dietary oils in experimental lipid metabolism disturbance. Acta Alimentaria 17(3); 1988; 211-218

Sexually mature Wistar male rats (OETI) were fed isoenergetically with synthetic lipogenic diet containing 20% of sunflower oil (P/S = 5.2) i.e. the same quantity of a mixture containing 33% sunflower oil and 67% MCT C_8 C_{10} (Medium Chain Triglycerides)-oil (P/S = 0.3) for 6 wks and certain indices of the serum and liver as well as the distribution of fatty acids in the liver, were studied. It has been found that as a response to the lipogenic diet the lipid indices of the serum and the liver increased considerably compared to the control animals consuming a normal diet, for both kinds of fats. On consumption of sunflower oil the level of serum lipids decreased significantly in comparison with feeding on fat mixture, but, at the same time, the total lipid, triglyceride and total cholesterol content of the liver was significantly higher than in case of the fat mixture. P/S ratio of the liver fat was nearly as high (4.2) as the P/S ratio of the diet (5.2) in case of sunflower oil consumption, however, on consumption of the oil mixture of lower P/S ratio (0.3) the P/S ratio of liver fat was also lower (1.36). Compared to the control, the proportion of total unsaturated fatty acids increased in the liver in consequence of development of disturbance in fat metabolism. In case of sunflower oil consumption the quantity of the polyunsaturated fatty acids and on consumption of the fat mixture rich in MCT the proportion of the monounsaturated fatty acids increased. Compared to the control values, after feeding the lipogenic diet the proportion of $C_{20:4}$ (arachidic acid) decreased significantly but as a response to the fat mixture in a much lower degree than in the case of sunflower oil. AS

SPICES AND CONDIMENTS

687 Thomann (R) and Brauer (U). Spice aromas with herbs. New fragrances for the food industry. Lebensmittelindustrie 35(4); 1988; 160-161 (De).

Essential oils

688 Lawrence (B). Progress in essential oils. Perfumer & Flavorist 13(6); 1988; 57-63

Covers clove oil, fig leaf absolute and thyme oil. BV

689 Naik (SN) and Maheshwari (RC). Extraction of essential oils with liquid carbon dioxide. The Pafai Journal 10(1); 1988; 18-24

Cardamom, celery, cumin, clove, fennel, ginger and sandalwood were extracted with liquid carbon dioxide by using a high pressure soxhlet apparatus. It is observed that extracts in liquid carbon dioxide are superior in comparison of extracts obtained from steam distillation and solvent extraction. BV

Spices

690 Kovacs-Domjan (H). Microbiological investigations of paprika and pepper with special regard to sporeformers including B. cereus. Acta Alimentaria 17(3); 1988; 257-264

From microbiological investigations of 64 spice samples (ground pepper and paprika) it is concluded that the dominant role in the microbiology of spices is played by aerobic sporeformers, including thermophiles. Detn. of the number of coliforms as fecal indicators must be substituted by detn. of the numbers of the Enterobacteriaceae family since the former occurs in very small numbers in these products. Since the occurrence of the Enterobacteriaceae family in the products is not rare, the presence of Salmonella must be expected, on occassion. In the case of the detection of the presence of Salmonella, the antimicrobial effect of the spices, as well as their microbiological conditions makes it necessary to use resuscitation of samples in large quantities of medium. With due consideration to the fact that in spices, as much as 50% B. cereus contamination may be expected, their direct detection is considered a necessity in those food products where multiplication may occur. According to the results of a comparative study mannitol-phenol red-egg yolk-polymixin agar may be substituted with a simple egg yolk agar for the detection of B. cereus in spices. AS

691 Krishnamurthy (N) and Shankaranarayana (ML). Manufacture and quality control aspects of ground spices. Beverage & Food World 16(1); 1989; 27-28

In this paper attempt has been made to indicate how a good quality spice powder can be made. Main steps involved in the manufacture of spice powder like selection of raw material and pre-cleaning, drying, grinding, sieving, packaing, fumigation, and control aspects of some spice powder are discussed. SRA

692 Toofanian (F) and Stegeman (H). Comparative effect of ethylene oxide and gamma irradiation on the chemical, sensory and microbial quality of ginger, cinnamon, fennel and fenugreek. Acta Alimentaria 17(4); 1988; 271

The effect of gamma irradiation and ethylene oxide fumigation on the microbiological and sensory properties of ground cinnamon, ginger, fennel and fenugreek, and on the volatile oil content of ground cinnamon, ginger and fennel was investigated. It was found that for cinnamon and ginger a 6 kGy dose, for fennel 6-10 kGy and for fenugreek 6-8 kGy dose were equal in microbial effects to the commercially established fumigation process. No significant changes in the volatile oil contents of the fumigated or irradiated cinnamon and fennel has been observed. Irradiation of ginger with a dose of 5 kGy resulted in a slight decrease of 14%, while fumigated ginger showed no significant loss in volatile oil content. Between the untreated, irradiated or fumigated spices no major differences in sensory properties were found. AS

Basil

693 Akgul (A). Volatile oil composition of sweet basil (Ocimum basilicum L.) cultivating in Turkey. Nahrung 33(1); 1989; 87-88

Sweet basil is one of the most widespread spices in the world. Its dried leaves are used commonly as a flavouring in many food products. A number of different types of basil oil have found and achieved economic importance. European basil oil contains approx. equal proportions of estragole (methyl chavicol) and linalool. Exotic or reunion basil is an oil rich in methyl chavicol. Methyl cinnamate basil is, as its name suggests, an oil rich in methyl cinnamate. And finally, eugenol basil oil contains eugenol in high percentages. Basil is a spice plant cultivated in some parts of Turkey, and used in soups, desserts, pickles etc. as a flavouring agent. However, no studies have been conducted so far on Turkish plant and volatile oil. Therefore, the object of this work was to study the volatile oil comp. of Turkish sweet basil cultivated in Erzurum region (East Turkey) having cold climate conditions. AS

Cardamom

694 Gopalakrishnan (N) and Narayanan (CS). Composition of volatile constituents of cardamom oleoresin obtained by carbon dioxide extraction. The Pafai Journal 10(2); 1988; 21-24

Comparative study of the comp. of cardamom (Eletteria cardamomum Maton, Alleppey var.) oleoresin extracted by supercritical carbon dioxide and hexane with the distilled cardamom oil was carried out. The yield was higher with carbon dioxide extraction than with hexane, but was lower than the yield obtained by distillation. The non-volatiles and chlorophyll contents were different in oleoresins and in oil. The carbon dioxide extracted oleoresin possessed natural aroma and was almost similar to the oil in comp. AS

Curcuma

695 Tonnesen (HH), Karlsen (J), Adhikary (SR) and Pandey (R). Studies on curcumin and curcuminoids, XVII. Variation in the content of curcuminoids in Curcuma longa L. from Nepal during one season. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 189(2); 1989; 116-118

The content of curcuminoids in Curcuma longa L. before, during and after a normal harvesting period was investigated. The plant material was grown in the Kathmandu area. Bis-demethoxycurcumin was found to be the main constituent. No significant change in the curcuminoid content was observed during a 17-wk sampling period. AS

Paprika

696 Sawinsky (J), Halasz (A) and Hornok (L). Propagation of some fusarium strains and study of their zearalenone production on ground paprika. Acta Alimentaria 17(4); 1988; 309-317

Moulds were isolated from ground paprika moulded under natural conditions. Three sp. dominated the samples: Alternaria alternata, Fusarium equiseti and Penicillium cyclopium. Potentially all the sp. isolated are toxigenic or facultative human pathogens. Some of the strains isolated, and Fusaria obtained from a stock collection and known for their toxigenic character, their growth and zearalenone production were investigated. Investigation were carried out partly under lab. conditions on ground paprika from Kalocsa, purchased on the retail market, and partly on stored samples of freshly picked sweet and hot paprika fruit. In both cases propagation of moulds was very intense but zearalenone production by the different sp. differed substantially. Production of zearalenone was highly significant (10 00 $\mu g/kg^{-1}$) when Fusarium semitectum isolated from sweet and hot ground paprika was cultured under lab. conditions. However, the same strain culture at an average temp. of 14 C produced only 1000 $\mu g/kg^{-1}$ zearalenone on both sweet and hot ground paprika. When, on the other hand, ground paprika samples randomly bought on the retail market were tested for zearalenone none of the 20 samples contained the toxin. The presence of zearalenone could not be detected in 4 paprika samples spontaneoulsy moulded, in spite of the observation that ground paprika is a very good medium for zearalanone production in certain Fusairum strains. This can be explained partly by the concomitant microflora and partly by the storage temp. applied. To be able to draw final conclusions the number and var. of samples has to be increased. AS

Rosmary

697 Tateo (F), Fellin (M), Santamaria (L), Bianchi (A) and Bianchi (L). Rosmarinus officinalis L. extract. Production, antioxidant and anti-

mutagenic activity. Perfumer & Flavorist 13(6); 1988; 48-54

This article covers the optimum conditions for the production of an extract from Rosmarinus officinalis L. having antioxidant and antimutagenic activity. DRE1 and DRE2 produced using the proposed simiplified technology, practically comparable with the commercial extract or which was taken as term of comparison and produced using a much more complex technology. The extraction treatment by supercritial carbon dioxide which is as efficient for deodourising as traditional method of steam flow distillation, gives an antioxidant products (DRE$_2$) with an activity comparable to the product deoleated by system flow distillation with an activity comparable to the product deoleated by steam flow distillation (DRE$_1$). The antimutagenic activity of rosemary extracts is less evident in regard to soy oil, even at considerably high concn. then those active in solid fat. SRA

SENSORY EVALUATION

698 Campanella (OH) and Peleg (M). On food compression by soft machines. Journal of Texture Studies 19(1); 1988; 39-50

Uniaxial compressive force deformation and relaxation curves of processed American cheese were recorded with and without metal springs in an in-series array. The rheological properties of the cheese were described in terms of the constants of a three element solid model and the constants used to predict the behaviour of the cheese-spring combinations. The fit of the model to the experimental observations was excellent for the deformation curves and reasonable for the relaxation curves. The potential application of this methodology to assess the true force deformation or time relationships in sensory evaluation of texture in more realistic imitative instrumental method is considered. AS

699 Lahtinen (ST). Comparison of two mathematical models for the stress overshoot in start-shear experiments of model emulsions. Acta Alimentaria 17(3); 1988; 219-225

The fit of modified Elliott-Green and Bird-Leider models with data obtained for two model emulsions were compared at the shear rate region that approx. to the stimuli associated with the perception of pourability and spreadability of salad dressings. A shortened measurement time was used because of the good correlation of the transient shear stress value, i.e. the max. stress value obtained over the initial part of the exp., with textural properties of foods. NaCl or one of two salt substitutes was added to the emulsions to study their influence on the rheological parameter values. It was observed that the modified Elliott-Green model better described the shear stress time behaviour of the emulsion. Both models failed to describe the shear stress-time behaviour of the emulsions. Both models failed to describe the shear stress growth accurately, but the modified Elliott-Green model fitted well to the data over the descending stress period. Except for one case, the transient shear stress value increased remarkably when Morton Lite Salt (50% w/w NaCl and 50% KCl) or mineral salt (65% NaCl, 25% KCl and 10% magnesium sulphate) replaced NaCl in the emulsion. AS

700 Lee III (WE), Deibel (AE), Glembin (CT) and Munday (EG). Analysis of food crushing sounds during mastication. Frequency time studies. Journal of Texture Studies 19(1); 1988; 27-38

The frequency components of sound generated during a series of ten consecutive chews were determined for fresh and stale samples of potato chips and tortilla chips. Airborne sound was processed by a fast fourier transform (FFI) signal analyzer while subjects masticated single chips with closed mouths. Analysis showed that the intensity of a given frequency range generally decreased with consecutive chews, with higher frequencies approaching inaudible levels. Significant differences were observed between fresh and stale samples with fresh samples being typically louder and displaying greater amounts of higher frequency components. Overall, the approach of studying consecutive chews is felt to give more information regarding the real eating process as opposed to studying the initial bite alone. AS

701 Seymour (SK) and Hamann (DD). Crispness and crunchiness of selected low moisture foods. Journal of Texture Studies 19(1); 1988; 79-95

Crispness and crunchiness of five low moisture foods subjected to 3 humidity conditions were investigated. Airborne acoustic output and force/deformation curves from shear/compression cell testing were recorded. Identically treated samples were evaluated by a trained texture profile panel. High correlations (R > 0.92) were found between sensory crispness and crunchiness for all products tested. Sensory hardness was strongly correlated (inversely with sensory crispness and crunchiness for three of the products). Mechanical force and work usually had the strongest correlations (inverse) with sensory crispness and crunchiness scores (R > 0.9). Acoustic parameters also had high correlations with the sensory parameters, and could be combined with mechanical properties to increase the explained variation significantly. The products advertised as crunchy were mechanically stronger than those advertised as crisp and acoustic variable that were highly correlated with sensory crunchiness tended to be at lower frequencies than was the case for products advertised as crisp. AS

702 Szczesniak (AS). The meaning of textural characteristics. Crispness. Journal of Texture Studies 19(1); 1988; 51-59

Two hundred consumers were asked to give examples of crisp foods and to provide descriptions of crispness. Lettuce, crackers, cold cereals, celery and potato chips were the most frequently mentioned examples (51% of total). Both dry-crisp and wet-crisp products were cited, the former slightly more often. Three categories of crisp products which accounted for 94% of total responses were: raw fruits/vegetables, farinaceous products (cold cereals, bread, hard rools) and fried products (both pan and deep fat fried). Words and sensations most frequently mentioned in crispness description were fresh, crunchy and crackly. Firm and snappy were also mentioned frequently. Consumer responses suggest that a crisp food may be defined as one that is firm and snaps easily when deformed emitting a crunchy/crackly sound. The perceptual difference between `crisp' and `crunchy' foods appears to be that a crisp product has a `snap' to it. AS

703 Szczesniak (AS) and Ilker (R). The meaning of textural characteristics - Juiciness in plant foodstuffs. Journal of Texture Studies 19(1); 1988; 61-78

Although juiciness has long been recognized as a very desirable textural attribute and although it is included in the sensory texture profile, no detailed information has so far been available on it sensory perception and the responsible morphological factors. Based on analytical and structural data, the following factors were identified as prerequisites to juiciness: high water content, organized cellular work with proper turgor and integrity, cell walls mechanically weaker than the middle lamella, low viscosity and little suspended solids in the expressed liquid. Juiciness increases with increasing cell size and decreasing cell wall thickness. Using the analytical approach of sensory texture profiling, juiciness was judged to be a multidimensional perception that includes: force with which the juice squirts out, total amount of juice released on chewing, flow properties of the expressed liquid and the contrast in consistency between the liquid and the suspended cell debris. A tentative 10-point ranking scale of juiciness is given. It relates well to cell size and instrumental measurements of liquid released on the 1st mechanical chew. AS

704 Vickers (ZM). Instrumental measures of crispness and their correlation with sensory assessment. Journal of Texture Studies 19(1); 1988; 1-14

Instrumental methods for measuring crispness focused primarily on force deformation measurements until crispness was hypothesized to be an auditory sensation. Since that time both acoustical and force-deformation measurements have been used to study crispness. The best measurements of sensory crispness have been combinations of both acoustical and force-deformation measurements. Such combinations have produced correlations with sensory crispness as large as r = 0.99. AS

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

705 Klaue (W) and Kraus (G). Examination of the application of fluid-crystalline separation phases for the gas chromatographic analysis of chloro-organic pesticides and polychlorinated biphenyls. Lebensmittelindustrie 35(4); 1988; 156-157 (De).

706 Moleyar (V) and Narasimham (P). Fungitoxicity of binary mixtures of citral, cinnamic aldehyde, menthol and lemon grass oil against Aspergillus niger and Rhizopus stolonifer. Lebensmittel-Wissenschaft und-Technologie 21(2); 1988; 100-102

The fungitoxicity of binary mixtures(1:1) of Citral, Cinnamic aldehyde and menthol as well as the comparative fungitoxicities of lemon grass oil and citral towards Aspergillus niger and Rhizopus stolonifer was assayed by shake culture technique. Citral, cinnamic aldehyde and menthol exhibited synergism in their fungitoxicity against the two fungi. Synergy ratios(SR) ranged between 1.29 and 1.95. Citral and Cinnamic aldehyde mixture at 100 µg ml^{-1} was most fungitoxic to A. niger, while citral and menthol mixture was for R. stolonifer. Further, at equal concn. lemon grass oil, the principal constituent of which is citral, was less antifungal than citral alone. However, the constituents of lemon grass oil other than citral were also antifungal though their combined activity was less than that of citral. AS

707 Roberts (WK) and Selitrennikoff (CP). Plant and bacterial chitinases differ in antifungal activity. Journal of General Microbiology 134(1); 1988; 169-176

Chitinases were isolated from the grains of wheat, barley and maize, and compared with those obtained from Serratia marcescens, Streptomyces griseus and Pseudomonas stutzeri for antifungal activity and enzyme specificity. The six enzymes were tested for antifungal activity using an assay based upon inhibition of hyphal extension of the fungi Trichoderma reesei and Phycomyces blakesleeanus. Antifungal activity was observed with as little as 1 ug of each of the grain chitinases, whereas none of the bacterial chitinases had any effect on hyphal extension, even at 50 µg chitinase per assay. This difference in antifungal activity correlated with the different mechanisms of action of the two classes of enzymes. In common with other plant chitinases, the grain chitinases functioned as endochitinases and contained lysozyme activity. In contrast, the bacterial enzymes were exochitinases and hydrolysed the chromogenic trisaccharide analogue p-nitrophenyl-beta-D-N, N'-diacetylchitobiose, which proved to be an excellent substrate for assaying bacterial chitinases. These exp. strengthen the hypothesis that plant chitinases function to protect the host against fungal infections. AS

708 Sarode (SV). Safety in pest control operations. Pesticides Information 14(2); 1988; 1-5

BIOCHEMISTRY AND NUTRITION

709 Anon. Tracking down biotin, the unknown' vitamin H. Beverage & Food World 16(1); 1989; 31

Biochemistry

710 Beynen (AC). Increased concn. of liver cholesterol in rats fed lactulose. Nahrung 33(1); 1989; 89-90

The disaccharide lactulose (beta-D-galactopyranosy (1-4)-D-fructofuranose) is thought to be poorly hydrolized by intestinal enzymes but is broken down by microorganisms in the colon. Thus lactulose shares with pectin similar characteristics. Lactulose is used in the food industry and in the treatment of constipation. There is preliminary evidence that dietary lactulose (5% w/w)causes increased concn. of serum and liver cholesterol in rats when compared with pectin. This paper describes dose-response relationships between dietary lactulose and cholesterol in either serum or liver. AS

711 Dongowski (G) and Bock (W). Mechanolysis of amide, ethyl and acetyl pectins. Nahrung 33(1); 1989; 37-41 (De).

Amide, ethyl and acetyl derivatives are prepared from pectin and partly from pectic acid. These pectin derivatives behave like normal pectin during mechanolytic degradation by vibration grinding under the usual pH-conditions in the air-dry state. A hydrolysis of alpha(1-4)-D-glycosidic bonds of the galacturonan molecules takes place accompained by a decrease in mol. wt. Amide, ethylester and acetyl groups are not split off. A destabilizing influence of one of these functional groups onto another one during mechanolysis was not observed. AS

712 Hajos (G), Mietch (F) and Halasz (H). Changes of degree of hydrolysis in the course of enzymatic peptide modification. Acta Alimentaria 17(3); 1988; 265-270

Hydrolysis and synthesis of peptide bonds as consequence of enzymatic peptide modification (EPM) have been studied by detn. of the degree of hydrolysis (DH) using the TNBS-method. Enzymatic hydrolysates of casein were used as substrates. All enzyme-catalyzed reactions were studied without and with the addition of L-methionine ethyl ester. Correlation between DH and reaction time could be described by power curves. In the case of EPM without amino acid addition, a moderately increasing curve while in the case of EPM with Met-addition, a slightly decreasing power curve was found to fit in satisfactorily with the experimental values. The results of exp. confirm the fact, that new covalent bonds were formed in the course of the enzymatic peptide modification. AS

713 Kato (A), Lee (Y) and Kobayashi (K). Deamidation and functional properties of food proteins by the treatment with immobilized chymotrypsin at alkaline pH. Journal of Food Science 54(5); 1989; 1345-1347, 1372

Ovalbumin, lysozyme, 7S globulin, 11S globulin, and gluten were treated with immobilized chymotrypsin on controlled-pore glass at pH 10 at 20 C to improve their functional properties. Optimum pH of deamidation of ovalbumin by immobilized chymotrypsin was 10, where proteolysis was very limited. Deamidation percentages of ovalbumin, lysozyme, 7S globulin, 11S globulin, and gluten were 10.0, 8.4, 6.0, 5.0, and 8.0 resp. SDS polyacrylamide gel electrophoretic patterns of ovalbumin and lysozyme showed no difference between untreated and treated proteins, while those of soy proteins and gluten showed that larger mol. wt. fractions were dissociated into smaller mol. size fractions. Solubility of gluten was greatly improved at all pHs, 2-12. Both emulsifying and foaming properties of proteins were improved by treatment with immobilized chymotrypsin. AS

714 Knuckles (BE), Kuzmicky (DD), Gumbmann (MR) and Betschart (AA). Effect of myo-inositol phosphate esters on in vitro and in vivo digestion of protein. Journal of Food Science 54(5); 1989; 1348-1350

Effects of phytate and its hydrolysis products (myo-inositol phosphate esters) on protein digestion were investigated by in vitro and in vivo procedures. Tri-, tetra-, penta-, and hexa-phosphate ester fractions, isolated from phytate hydrolysates, inhibited pepsin digestion of casein and bovine serum albumin in vitro. The inhibition ranged from 0% for the mono- and diphosphate esters to 9-14% with the hexaphosphate ester (phytate). The phosphate ester fractions did not significantly affect trypsin digestion of the proteins. In the in vivo study, rats were fed phytate and hydrolysates thereof (mixtures of the esters above) at levels of 1-3.5% of the diet. Under the conditions of this study, neither phytate nor its hydrolysates significantly affected protein utilization or wt. gain in rats. AS

715 Kuhn (T) and Steinhart (H). Determination of the monomer composition in dietary fiber with a time-saving hydrolysis procedure. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 188(1); 1989; 7-10 (De).

A hydrolysis method for polysaccharides is presented, which allows for faster and more extract detn. of the monomer comp. in dietary fibre fractions (in comparison to the usual acidolysis method). Polysaccharide samples of the fibre cellwalls have been hydrolysed under reductive conditions (TFA/FA; 1+1) in small autoclaves at oven temp. of about 210 C. From the reaction mixtures, the different monosaccharides were transformed into alditolacetates and determined quantitatively by capillary gas chromatography. AS

716 Ludwig (I), Ludwig (E) and Pingel (B). Micro method for the determination of the fat-holding capacity of proteins. Nahrung 33(1); 1989; 99-101 (De).

717 Mietsch (F), Feher (J) and Halasz (A). Investigation of functional properties of partially hydrolyzed proteins. Nahrung 33(1); 1989; 9-15

Hydrolyzates were prepared from soy protein and milk protein by treatment with Alcalase(R) 0.6 L and Neutrase (R) 0.5 L (NOVO INDUSTRI A/S, Bagsvaerd, Denmark). The pH-stat is a good method to control the change of degree of hydrolysis (DH) during enzymatic reactions and gives as well a good possibility to produce partially hydrolyzed products. In case of both investigated substrates we found a good correlation between the DH-value measured by pH-stat and TNBS-method. Determining the functional properties, we found that the emulsifying activity of hydrolyzates with low DH (below 10%) is significantly improved. At the same time the enzymatic treatment decreases the water-binding capacity considerably but increase the velocity of water binding. AS

718 Nyman (ME) and Bjorck (IM). In vivo effects of phytic acid and polyphenols on the bioavailability of polysaccharides and other nutrients. Journal of Food Science 54(5); 1989; 1332-1335, 1363

The effects of the antinutrients tannic acid, catechin and phytic acid on digestion of starch, protein and lipids, and fiber degradation were studied in rat balance exp. To separate digestion in the small intestine from fermentation in the hind-gut, diets were tested without and with the addition of antibiotics. The antinutrients had no effects, either on starch digestion or on fiber fermentation. In contrast, inhibition of protein digestibility was observed with all antinutrients tested, while the digestibility of lipids was reduced only with phytic acid and tannic acid. The fermentability of undigestible protein was affected by tannic acid, whereas that of lipids was affected also by phytic acid. AS

Nutrition

719 Christensen (EH). Characteristics of sugar beet fiber allow many food uses. Cereal Foods World 34(7); 1989; 541-546

Sugarbeet fiber offers a combination of soluble and insoluble dietary fibers that defines its dietary and functional advantages. It is a rich source of pectin, hemicellulose, cellulose dietary fibers. The high water holding capacity and low viscosity of sugarbeet fiber pectin and hemicellulose fractions play a critical role in its extrudability and shelf-life properties. PHR

720 Gordon (DT). Functional properties vs physiological action of total dietary fiber. Cereal Foods World 34; 1989; 517-525

This feature article deals with physicochemical properties of dietary fiber and its physiological action in the alimentary tract. The author also discusses the mechanism of action of dietary fiber in its beneficial effect in regard to human health. PHR

721 Hall (JM). A review of total dietary fiber methodology. Cereal Foods World 34(7); 1989; 526-528

This article deals with the different methods of estimating acid detergent fiber and neutral detergent fiber in foods. The article also discusses the advantages and accurracy of each method. PHR

722 Mathura Pai (S) and Rama Naik (K). Nutritional status fo selected rural school children of Dharwad district, Karnataka. Indian Journal of Nutrition and Dietetics 26(4); 1989; 108-112

The investigation was carried out to study malnutrition, a common problem during school age period in Karnatak rural school children. The nutritional status was assessed by anthropometric indices in 254 children of age group 6-10 yr. from villages of Dharwad, Karnataka (India). As recommended by W.H.O. three indicators viz. wt. for age, height for age and wt. for height were used and several possible classifications of the nutritional status of the target group was made by comparison with reference to population. Results showed that significant differences were seen in wt. of female and male children in 91/2 yr age group, the differences significant only in case of 61/2 and 71/2 yr age group of males and 81/2 and 91/2 yr. age group of females both in height and wt. They were all below the Indian Council of Medical Research Standard in height and wt. Of the total children examined 48.85% were classified as normal, 11.81% as currently underfed with past history of malnutrition and 23.62% normally fed with past history of malnutrition and 14.963 currently underfed. Only two children (0.79%) classified as over fed with past histroy of malnutrition. NGKR

723 Moron (C), Kremenchuzky (S), Passamai (MI), Cintioni (A), Gerschcovich (C) and Mendiondo (I). Bioavailability of iron in a diet based on fortified extruded maize-soybean in women. Nutrition Reports International 39(6); 1989; 1195-1204

The bioavailability of iron in a diet based on extruded maize-soybean semolina (70:30) was studied in a group of 39 women, presumably healthy and of a low socioeconomic levels, 19 of which received the diet fortified with vitamins and minerals, which contained, among other nutrients, 46 mg of ferrous fumarate and 40 mg of ascorbic acid per 100 g of the product. Nonheme iron absorption at breakfast, lunch and supper, determined by the extrinsic-label method, was with fortified diet: 2.36, 6.82 and 3.83% resp. and with the non-fortified diet: 1.51, 3.22 and 1.89%. The difference was statistically significant only at lunch (P less than or equal to 0.05). The quantities observed in the three meals were significantly greater with the fortified diet (P less than or equal to 0.001). The daily bioavailability of total iron in the normal women was 2.74 mg with the fortified diet and 1.18 mg with the non-fortified diet. This shows that the level of fortification used with the ferrous fumarate is adequate. In view of the wide dissemination of maize-soybean mixtures, their fortification could be used in food aid programmes, particularly in regions with a high prevalence of iron deficiency in the population. AS

724 Whittaker (P), Spivey Fox (M(R) and Forbes (AL). In vitro prediction of iron bioavalability for food fortification. Nutrition Reports International 39(6); 1989; 1205-1215

A simulated gastrointestinal digestive system was used to compare in vitro dialyzability of ferric phosphate, $2H_2O$ (ferric phosphate) and electrolytic Fe with that of ferrous sulphate. $7H_2O$ (ferrous sulphate) as a reference in a farina cereal meal and in standard purified rat and guinea pig diets. The system, in which Fe passes from an enzymatic digest into dialysis tubing containing sodium carbonate, was adapted to assess the bioavailability of standard forms of fortification Fe. Mean (plus or minus SEM) dialyzed Fe values from ferrous sulphate in the 3 diets were 1.46 plus or minus 0.04, 2.69 plus or minus 0.14, and 1.71 plus or minus 0.05%, resp. The mean relative dialyzability range was 0.71-0.73 for electrolytic Fe and 0.14-0.47 for ferric phosphate. The possible enhancing effects of added Na2EDTA (EDTA) and vitamin C were also assessed with ferrous sulphate. The per cent dialyzed Fe was similar for ferrous sulphate + EDTA (1:1 mole ratio) and NaFe (III) EDTA in each meal. Mean values were 26,6 and 25.9% (farina), 23.9 and 22.8% (rat), and 17.9 and 18.4% (guinea pig) for ferrous sulphate + EDTA and NaFE EDTA, resp. A 1:1 mole ratio of ferrous sulphate + vitamin C produced 16.2, 14.90, and 14.2 dialyuzed Fe and a 1:2 ratio produced 23.5, 17.5, 17.8% for the 3 diets, resp. The addition of 2 moles vitamin C was required to approx. the enhancing effect of 1 mole EDTA. The in vitro method provides a simple screening tool which may prove valuable in assessing Fe bioavailability for fortification purposes. AS

TOXICOLOGY

725 Deo (PG), Hasan (SB) and Majumder (SK). Toxicity and suitability of some insecticides for household use. International Pest Control 30(5); 1988; 118-121, 129

In this study a new concept is introduced in order to asses the pesticide suitability by considering a number of important properties rather than one single property such as LD50 to target pest, saftey to mammals, etc. Only five properties and the ideal values are considered. SRA

Bacteria

Bacillus

726 Zegota (H) and Pietka (M). Elimination of the toxic effects of patulin of Bacillus subtilis and B. megaterium by irradition. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 188(4); 1989; 348-350

The bacteriological toxicity of patulin irradiated in aqueous solutions was investigated using two strains of bacteria, Bacillus subtilis and B. megaterium. The results of the plate cultivation test showed that the growth inhibition of both strains decreased in relation to absorbed dose. A dose of 1.8 kGy was sufficient to climinate the bacteriological toxicity of patulin at an initial concn. of 125 ug/ml. There was good correlation between the concn. of patulin in the irradiated solution as measured spectrophotometrically and that calculated from the diameter of the inhibition zone. AS

Aflatoxins

27 Orvehde (M), Haggblom (P) and Soderhall (K). Nitrogen inhibition of mycotoxin production by Alternaria alternata. Applied and Environmental Microbiology 54(10); 1988; 2361-2364

Alternaria alternata produces the polyketides alternariol (AOH) and alternariol monomethyl ether (AME) during the stationary growth phase. Addition of 12 mM sodium nitrate to the cultures before initiation of polyketide production reduced the AOH and AME content to 5 to 10% of that of controls. Glutamate and urea also reduced AOH and AME accumulation, whereas increasing the ionic strength did not affect the polyketide content. Adding sodium nitrate after polyketide production had started did not inhibit further AOH accumulation, although over 90% of the added nitrate $^{-1}$ disappeared from the medium within 24 h. Activity of an AME synthesizing enzyme, alternariol-O-methyltransferase (AOH-MT), appeared in control mycelia during the early stationary growth phase. No AOH-MT activity appeared in mycelia blocked in polyketide synthesis by addition of sodium nitrate. Later addition of sodium reduced the AOH-MT specific activity to 50% of that of the control, whereas the total of activity per mycelium was the same. The AOH-MT activity in vitro was not affected by 100 mM sodium nitrate. The results suggest that N in some way inhibited the formation of active enzymes in the polyketide-synthesizing pathway in A. alternata when it was added before these enzymes were formed. AS

FOOD LAWS AND REGULATIONS

Nil

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GENERAL

728 Anon. Glass contamination: is there an answer. Food Manufacture 64(10); 1989; 55, 57-58

Contamination of food products with glass and its detection is discussed. BV

729 Jeffery (MS). On-line quality control. Maintaining standards in manufacturing. Manufacturing Confectioner 69(6); 1989; 123-126

The three main elements of a successful quality programme, namely establishing and communicating commercial standards, controlling product quality and quality auditing are discussed briefly. SYR

730 Roy (SK). Post-harvest handling, storage, and transportation of fruits and vegetables. Beverage & Food World 16(1); 1989; 40-41

This article deals briefly on handling, storage (refrigeration; -cool store, ice bank cooler), controlled/modified atm., hypobaric, waxing, polymeric film, chemicals, irradiation, evaporative cooling-cool chambers; and transportation of fruits and vegetables. SRA

731 Srivastav (PP), Sitaram Prasad and Das (H). Some traditional foods prepared from roasted grains. Beverage & Food World 16(1); 1989; 50-52

The preparation of traditional ready-to-eat foods and their uses have been summerised. Covers food products, flattened products, raw materials (paddy, Bengal gram, maize, jowar) equipment and appliances, roasted/puffed products, processing of paddy, conditioning, preheating and roasting/puffing and roasted grain powder. SRA

732 Tajima (M), Ishima (T), Ohtsuka (Y) and Tamaki (Y). The database system of chemical substance related to food fields. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 36(6); 1989; 502-507 (Ja).

New database system of information of chem. substances related to food processing was developed. The system function was designed and application softwares were developed. The host computer system was ACOS-850, and DATA-170 was used as DBMS (Database Management System). The outline of the database is as follows. It includes physical data, spectral data, biological data, production and shipment data and legal data of food additives, enzymes and microbial products. Text data are written in Japanese. The software program to exchange the data between this database and other ones which were controlled by IBM system was also developed. AS

733 Vink (W). Quality auditing. Manufacturing Confectioner 69(6); 1989; 111-114

The four types of quality audits which are essential to a product's success are described. These are factory audits, consumer complaint audits, field audits and vendor audits. SYR

734 Warnecke (MO). Total quality and the future. Manufacturing Confectioner 69(6); 1989; 117-120

The article describes all aspects of total quality programme of a company. A total quality programme should be company's long range plan. The quality improvement in all areas can be accomplished by monitoring the process, identifying problems, identifying causes and implementing corrective action. SYR

FOOD PROCESSING

Extrusion

735 Guzman (GJ), Murphy (PA) and Johnson (LA). Properties of soybean-corn mixtures processed by low-cost extrusion. Journal of Food Science 54(6); 1989; 1590-1593

Ground soybeans and corn at ratios 60:40, 70:30, 80:20, and 100:0 soybean:corn were extruded with an Insta Pro 600 extruder. Initial moisture content was adjusted to 10%. Extruder exit temp. were 127, 138, 149 and 160 C. Soybean trypsin inhibitor activity was destroyed 48.9 to 98.8% as exit temp. increased. Extrusion temp. had no major effect on the tocopherol isomers. Lipoxygenase was completely inactivated by extrusion. In vitro protein digestibilities of samples extruded at 127 C were significantly lower than samples extruded at higher temp. Residual lipase activity ranged from 2.7 to 63.7 micromoles H^{+} . min^{-1} . g^{-1}. AS

Extrusion cooking

736 Smith (A). Extrusion cooking. A review. Food Science & Technology Today 3(3); 1989; 156-161

Review covers equipment, combination of textures, functional properties, products (confectionery), nutrition, starches and fibres. BV

FOOD PACKAGING

Packaging materials

737 Iwata (T). Function of food container package and functional packaging material. Packaging Japan 10(49); 1989; 40-43

Review describes meaning of function, function of container package, way of thinking as to food hygiene law and functional packaging material. SRA

738 Singh (R). Glass containers-ideal packaging media for food and pharmaceutical products. Beverage & Food World 16(1); 1989; 55

Packaging industry, packaging for food preservation, humidity, light, glass containers, measures needed for reducing the cost of glass containers (excise duty exemption, technology upgradation) are briefly covered. SRA

FOOD ENGINEERING AND EQUIPMENT

739 Greener (IK) and Fennema (O). Barrier properties and surface characteristics of edible, bilayer films. Journal of Food Science 54(6); 1989; 1393-1399

Various formulation and method of fabricating a film consisting of edible hydrocolloids, and lipids were investigated. Two formulation consisting of a methylcellulose base layer and a beeswax layer, deposited either from a molten state (Wax-M film) or from an ethanolic solution (Wax-M film), were examined for water vapour permeability (WVP) oxygen permeability and other physical properties. WVP values ($g.mil.m^{-2}$ day^{-1} mm Hg^{-1}) for the Wax-M and Wax-S films were 0.5 plus or minus 0.05 and 1.6 plus or minus 0.4 resp. WVP of the two films did not change significantly after storage for 1 wk at -40 C. Oxygen permeability values (g. $cm.cm^{-2}$ sec^{-1} mm Hg^{-1} x 10^{-12}) for the Wax-M and Wax-S films were 0.021 plus or minus and 0.007 plus or minus 0.002, resp. The Wax-M film had a more uniform surface topography than the Wax-S film. AS

740 Holberger (NK). Continuous cooking with automatic controls. Manufacturing Confectioner 69(10); 1989; 77-79

The paper describes briefly the automatic controls of the preheating, final cooking and vacuuming of high boil syrups. SYR

741 Iglesias (HA), Chirife (J) and Fontan (CF). On the temperature dependence of isosteric heats of water sorption in dehydrated foods. Journal of Food Science 54(6); 1989; 1620-1623, 1631

The usual procedures for calculating isosteric heats of sorption by the application of the Clausius-Clapeyron equation (e.g. sorption isosteres or the intregated form) to isotherms at different temp., was examined. For almost all foods studied the magnitude of the heat curves seemed to be dependent on the temp. interval used for its calculation. However for some foods the relative differences in the isosteric heat curves were much more marked than in others. The observed behaviour may be tentatively attributed to changes occuring in foods subjected to increased temp. in the "semi-dry" or "dry" state. These changes may be identified with among others cross-linking and denaturation of proteins, non-enzymatic browning reactions and the like. AS

Engineering

742 Bhattacharrya (AKM) and Padmanabhan (M). Modelling flow in cylindrical extruder dies. Journal of Food Science 54(6); 1989; 1584-1589

Volumetric flow rate was studied in the die of a single screw extruder. Variables included the ratio of die length to die diameter, barrel to die diameter, barrel and die temp., screw speed and product moisture. Die conductance was determined graphically and analytically. Results indicated that for a constant pressure drop across the die, increasing temp. die diameter or moisture increased flow rate. Dimensional analysis was used to study the effect of each parameter on the flow through the extruder die. An expression for temp. rise due to viscous dissipation for isothermal flow in the die was developed and monographs are presented. AS

743 Greener (IK) and Fennema (O). Evaluation of edible, bilayer films for use as moisture barriers for food. Journal of Food Science 54(6); 1989; 1400-1406

Two edible, bilayer films, consisting of methylcellulose (MC) and polyethylene glycol 400 in the hydrocolloid layer, and beeswax, either applied molten (Wax-M film) or from an ethanol solution (Wax-S film), in the lipid layer, were evaluated as barriers to water vapour (WV) after abusive tests. The Wax-M film maintained its WV barrier properties better than the Wax-M film was also evaluated as a moisture barrier when formed in place on the surface of brownies. When brownies were stored at 100% relative humidity and 25 C, the Wax-M film significantly ($P < 0.05$) decreased moisture absorption as compared to that of control samples. AS

744 Lakritz (L) and Maerker (G). Effect of ionizing radiation on cholesterol in aqueous dispersion. Journal of Food Science 54(6); 1989; 1569-1572

Aqueous sodium stearate dispersion of cholesterol were irradiated at 0-2 C with absorbed doses ranging from 2.5 to 50 kGy. The resulting mixture of cholesterol derivatives was isolated and examined for 7 ketocholesterol and cholesterol 5 alpha-6alpha-epoxide and 5 beta, 6 beta-epoxide content. Concn. of all three compounds increased with dose, while the ratio of 7-ketocholesterol to total epoxides decreased with increasing dose. The ratio of 7-ketocholesterol to the epoxides was approx. 1 or below at all dose levels while the same ratio in autoxidations of cholesterol in dispersions was normally 6 or greater. The change in the keto/epoxide ratio may be a means for determining whether meat or other foods containing cholesterol have been subjected to ionizing radiation. AS

745 Lebowitz (SF) and Bhowmik (SR). Determination of retortable pouch heat transfer coefficients by optimization method. Journal of Food Science 54(6); 1989; 1407-1412

A computer-based optimization technique was developed for determing the apparent heat transfer coeff. (h) for retortable pouches heated by circulated hot water were overriding air pressure. The technique incorporated actual process data, a finite differences model and an optimization criteria to converge on h values. A water flow channel was constructed to fit inside a vertical retort which allowed direct water exposure on the pouch surface at a quantifiable velocity. Because the optimization technique was not dependent on analytical equations, it could be applied to such areas as future heat transfer studies of new retortable pouch materials, designing new pouch-holding cassettes and improving water flow patterns in retorts. AS

746 Weintraub (SE), Ramaswamy (HS) and Tung (MA). Heating rates in flexible packages containing entrapped air during overpressure processing. Journal of Food Science 54(6); 1989; 1417-1421

Experiments were performed in two steam/air retorts and one water immersion retort to test the influence of included air on heating rate index (f) values at the centre of thin plastic bricks packaged in retort pouches and processed under various temp. and overpressure conditions. In general, high air overpressures (> 80 kPa) allowed up to 30 mL air to be included with no detrimental effect on heating rates; however, even small amounts of entrapped air (< 5 mL) degraded heat transfer when processed at low air overpressures (< 40 kPa). Processing medium and retort type were important faciors in the sensitivity of heating rate to increases of air vol. beyond a threshold value. AS

Drying

747 An-Erl King (V), Zall (RR) and Ludington (DC). Controlled low-temperature vacuum dehydration. A new approach for low-temperature and low-pressure food drying. Journal of Food Science 54(6); 1989; 1573-1579, 1593

The processes of free-drying, vacuum drying and controlled low-temp. vacuum dehydration (CLTV) were used to dry clam paste and gelatin-microcrystalline cellulose model food system. CLTV was carried out as cold as possible without freezing the product. Much less drying time was required for CLTV and vacuum drying than for freeze-drying. The mass transfer resistance for both freeze-drying and CLTV was less than that of vacuum drying. Functional properties were closer to those of freeze-drying than to vacuum drying. CLTV versus freeze-drying showed a 30% reduction in enthalpy change and 40% reduction in running cost. Microbiological analysis used to monitor the safety of processing clam paste, showed that the process was satisfactory relative to common parameters. AS

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

Chemistry

748 Huang (T-C), Bruechert (LJ) and Ho (C-T). Kinetics of pyrazine formation in amino acid-glucose systems. Journal of Food Science 54(6); 1989; 1611-1614

The chemistry and kinetics of pyrazine formation were studied in four amino acid-glucose model system. Different amounts of the same alkylpyrazines were produced in the four systems. The most abundant alkylpyrazine generated in a glycine-glucose system was 2,3,5-trimethylpyrazine, while 2-methylpyrazine was most abundant in an arginine-glucose system and 2,5-dimethylpyrazine predominated in a histidine-glucose system. 2-methylpyrazine and 2,5-dimethylpyrazine were the two most abundant alkypyrazines in a lysine glucose system. Kinetic data from the arginine-glucose system indicated that each of four selected pyrazines was formed by a pseudo-zero-order reaction. Activation energies in the same system were determined to be 19.5 plus or minus 4.1 Kcal mole for pyrazine, 24.8 plus or minus 8.7 Kcal Mole for 2-methylpyrazine, 20.8 plus or minus 4.7 Kcal Mole for 2,6-dimethylpyrazine and 29.0 plus or minus 3.8 Kcal Mole for 2-methyl-6, 7-dihydro-5H-cyclopen tapyrazine. AS

749 Velisek (J), Davidek (T), Davidek (J), Trska (P), Kvasnicka (F) and Velcova (K). New imidazoles formed in non-enzymatic browning reactions. Journal of Food Science 54(6); 1989; 1544-1546

1,3-Bis (carboxymethyl)imidazole was identified in a model reaction mixture derived from glycine, glyoxal, and formaldehyde. The same compound was also found in the reaction of glycine with glyoxal. The structure of this compound was elucidated from the measured mol., mass and H-NMR and C-NMR spectral data and confirmed by X-ray crystallographic measurements. Similarily, a 2-methyl-, 4-methyl-, and 2,4 dimethyl-1-3-bis (carboxymethyl)-imidazole were formed in reactions of glycine with glyoxal or methylglyoxal and formed in reactions of glycine with glyoxal or methylglyoxal and formaldehyde or acetaldehyde. These 1,3-symmetrically substituted imidazoles represent quite a new group of N-containing heterocyclic compounds originating in model systems containing amino acids and alpha-dicarbonyl compounds and probably also in natural systems. AS

Chemistry(Analytical)

750 Park (PSW) and Addis (PB). Derivatization of 5Alpha-cholestane-2, Beta-5, 6 Beta-triol into trimethylsilyl ether sterol for GC analysis. Journal of the American Oil Chemists" Society 66(11); 1989; 1632-1634

Chemical identity of 5alpha-cholestane-3-Beta-5,6Beta-triol (C-Triol) as a trimethylsilyl (TMS) ether derivative was studied using gas chromatography (GC) mass spectrometry (MS), and proton nuclear magnetic resonance (NMR) spectroscopy. The derivatization mixtures, held at 23 C for 30 and 300 min, showed only a single peak (B) by GC. When the mixture was heated at 70 C for a few hours, another peak (A) emerged ahead of peak (B). GC-MS analysis revealed that the GC peaks (A) and (B) are C-Triol as tris and bis-TMS ether derivatives, resp. NMR analysis suggested that the hydroxyl groups at C_3 and C_6 of C-Triol were involved in the formation of the bis-TMS ether. AS

FOOD MICROBIOLOGY AND HYGIENE

751 Park (YS), Ohtake (H), Toda (K), Fukaya (M), Okumura (H) and Kawamura (Y). Acetic acid production using a fermentor equipped with a hollow fiber filter module. Biotechnology and Bioengineering 33(7); 1989; 918-923

The continuous production of acetic acid by Acetobacter aceti M23 was carried out using a fermentor equipped with a hollow fiber filter module. The culture continued for 830 h with various dilution rates, which were changed stepwisely from low to high. The final cell concn. was 21.9 g dry cell/L and the max. productivity of acetic acid was 12.7 g/L.h for the exit acetic acid concn. of about 50 g/L. The productivity was higher than any literature's values surveyed so far. The cell concn. was 62.8 times and the productivity was 4.6 times as high as those of the fermentor without the filter module. The productivity increased with the increase of dilution rate up to 0.3 h^{-1} It is interesting to note that the viable cell concn. was kept almost constant about 1.1 x 10^9 cells/mL in spite of the increase of dilution rate. Use of oxygen rich air was indispensable to establish the high productivity of acetic acid. AS

Enzymes

Amylases

752 Udupa (SL), Prabhakar (AR) and Tandon (S). Alpha-amylase inhibitors in foodstuffs. Food Chemistry 34(2); 1989; 95-101

The incidence of dental caries in children of South Karnataka is very high. An important etiological factor influencing the development of caries is the type of food consumed. Salivary amylase exerts a protective effect over teeth by hydrolysing large polysaccharide molecules left in the oral cavity which could otherwise serve as a matrix to encompass bacteria and result in tooth decay. Inhibitors of alpha-amylase present in these foodstuffs can therefore reduce this protective effect. The inhibition of salivary alpha-amylase of a group of 10 school children by some of the most commonly consumed local foodstuffs was studied. Rice preparations (rice idli, rice gruel and boiled rice), fish fry and banana did not have any effect on salivary amylase activity. A statistically significant effect was observed with the sweet preparations (kadla payisa and kesari baath), and the fried foods (potato chips and groundnuts). Inhibition by other foodstuffs (dosa, idli and upma) was slight and not significant. Considerable variations in basal amylase activity and susceptibility of alpha-amylase of individuals to inhibition by particular foodstuffs were also observed. It is possible that some component in saliva may be able to moderate the action of the inhibitor in resistant individuals. AS

Glucoamylases

753 Saha (BC) and Zeikus (JG). Microbial glucoamylases. Biochemical and biotechnological features. Starch/Starke 41(2); 1989; 57-64

A comprehensive review has been presented on microbial glucoamylase, which is one of the most important industrial enzymes. The aspects covered include the occurence and production of various types of glucoamylases, their multiplicity, molecular characteristics, action pattern on soluble and insoluble substrates, thermal stability and various industrial uses. 186 references. SZA

Ethyl alcohol

754 Mistry (FR) and Cooney (CL). Production of ethanol by Clostridium thermosaccharolyticum. II. A quantitative model describing product distribution. Biotechnology and Bioengineering 34(10); 1989; 1305-1320

A study of the continuous culture of Clostridium thermosaccharolyticum on xylose showed multiple steady states and hysteresis. A quantitative model based on the biochemistry and physiology of xylose fermentation by C. thermosaccharolyticum was developed. The objective in developing this model was the bring together the observations both of this study and of other researchers on the fermentation of xylose. The model equations were written based on the metabolic pathway for xylose utilization by C. thermosaccharolyticum and the requirement that the carbon, ATP and NADH within the cell be balanced. Given the specific growth rate MU and the specific xylose utilization rate q a set of product distributions (ethanol, acetate, and lactate) satisfying these balances was obtained. This set was plotted on a triangular plot and named the permitted region. The product distributions within this permitted region were shown to be affected by the environmental parameters such as Fe concn. and hydrogen partial pressure. The model predicted trends in product distribution which correlate with experimentally observed phenomena.

The model was also used to analyze the continuous-culture data from our experimental work. AS

755 Mistry (FR) and Cooney (CL). Production of ethanol by Clostridium thermosaccharolyticum I. Effect of cell recycle and environmental parameters. Biotechnology and Bioengineering 34(10); 1989; 1295-1304

The direct microbial conversion (DMC) process for the production of ethanol from lignocellulosic biomass is limited by low volumetric ethanol production rates due to the low cell densities of Clostridium thermosaccharolyticum which is a key organism for ethanol production in this process. Hence, this study focuses on the use of a continuous-culture cell recycle system to improve the volumetric ethanol productivity and yield of the fermentation of xylose by C. thermosaccharolyticum. Early exp. with the continuous-culture cell recycle system showed a two-fold improvement in volumetric ethanol productivity. However, the ethanol yield at the higher dilution rates suffered because of the large amount of lactate produced. The manipulation of two environmental parameters-iron concn. in the nutrient medium and nitrogen purge rate of the fermentor headspace-allowed a dramatic reduction in the lactate production and a simultaneous improvement in the ethanol titer and yield. Under the improved conditions of increased iron concn. (12.5 mg/L ferrous sulphate) and decreased nitrogen purge rate (0.1 L/min), a continuous culture of C. thermosaccharolyticum operating at a dilution rate of 0.24 h and 50% cell recycle produced 8.6 g/L ethanol and less than 1 g/L each of acetate and lactate. The volumetric ethanol productivity was 2.2 g/L/h, which is 8 times larger than obtained for a continuous culture operated with no cell recycle and the same specific growth rate. AS

Fermented foods

Tempeh

756 Ashenafi (M) and Busse (M). Inhibitory effect of Lactobacillus plantarum on Salmonella infantis, Enterobacter aerogenes and Escherichia coli during tempeh fermentation. Journal of Food Protection 52(3); 1989; 169-172

Growth and inhibition of Salmonella infantis, Enterobacter aerogenes and Escherichia coli in fermenting soybeans during tempeh production were studied in presence and absence of Lactobacillus plantarum. In fermenting unacidified soybeans S. infantis grew by 7 log units in 40 h. E. coli and E. aerogenes grew by 6 and 7 log units resp. A similar pattern of growth of the three test organisms in fermenting acidified beans was also noted. Further inoculation of unacidified cooked beans with L. plantarum at a level of 10 /g resulted in a complete inhibition of the test organisms in the product. On acidified cooked beans a lower level of L. plantarum inoculum (10 /g) was enough to show a complete inhibitory effect. The lowering of the pH in fermenting beans by L. plantarum might have played a role in the destruction of the test organisms. AS

Microorganisms

Bacteria

Bacillus cereus

757 Angles Mosso (M), Luisa Garcia Arribas (M), Cuena (JA) and Carmen De La Rosa (M). Enumeration of Bacillus and Bacillus cereus spores in food from Spain. Journal of Food Protection 52(3); 1989; 184-188

The Bacillus and B. cereus spore population of 102 samples of food (salad dressing, dried soups, sweet desserts, milk and milk products, rice dishes, pasta and flour), 93 collected from retail market of Madrid and 9 from Chinese restaurants have been studied. Bacillus spores were detected in 82.4% of the samples. While the incidence of B. cereus spores was 14.7%. In salad dressing and dried soups the contamination rate by sp. of Bacillus was 100% and also both showed the highest contamination of B. cereus spores (25% and 50% resp.). No samples of rice dishes and pasta exhibited B. cereus spore contamination although these were contaminated by other Bacillus sp. AS

Clostridium perfringens

758 Jong (Jde). Spoilage of an acid food product by Clostridium perfringens, C. barati and C. butyricum. International Journal of Food Microbiology 8(2); 1989; 121-132

Spoilage of canned pasteurized brined mung bean sprouts, acidified with citric acid to pH 4.0-4.5, was found to be caused by acid tolerant Clostridium spp. including the sp. barati, perfringens and butyricum. The pH limit for growth in the brine used were estimated 3.7, 3.7 and 4.0 resp. Some of the isolated C. perfringens strains produced enterotoxins in sporulation media. The spores of the isolated anaerobes appeared to originate from mung beans, but C. barati and C. perfringens strains freshly isolated from dry beans, the oxygen concn. decreased, while carbon dioxide concn. increased considerably, due to respiration of the sprouts and actively growing Enterobacteriaceae and lactobacilli. It was assumed that this allowed C. barati and C. perfringens strains to grow and acquire the observed unusual acid tolerance. After increasing aerobicity during sprouting, no growth of Clostridium spp. was observed, substantiating the assumption. AS

Listeria

759 Pusch (DJ). A review of current methods used in the United States for isolating Listeria from food. International Journal of Food Microbiology 8(2); 1989; 197-204

Two cultural and two rapid Listeria isolation procedures used in the United States is reviewed in this presentation. AS

Listeria monocytogenes

760 Farber (JM). Thermal resistance of Listeria monocytogenes in foods. International Journal of Food Microbiology 8(2); 1989; 285-291

Recent studies on the heat resistance of Listeria monocytogenes in dairy products, the discrepancies in results and some of the difficulties involved in comparing interlab. exp. are reviewed. In addition, some current work on the thermal resistance of the organism in meat products is discussed. AS

761 Mossel (DAA). Listeria monocytogenes in foods. Isolation, characterization and control. International Journal of Food Microbiology 8(2); 1989; 183-195

The intent for examining foods for Listeria monocytogenes i.e., surveying for epidemiological purposes, or to inspect consignments of foods for microbiological safety, determines which analytical method is to be used. For instance resuscitation of debilitated cells may be required, and the degree of accuracy and precision necessary should be considered. Moreover, in the case of acceptance-or-rejection monitoring target values for `absence' of the pathogen have been amply but not always effectively discussed. Recommendation are given for assessing adequate repair of sublethally damaged populations of L. monocytogenes and for performance testing of selective enrichment and isolation media to be used for the isolation and enumeration of L. monocytogenes. An approach to the empirical assessment of reference values for L. monocytogenes in foods processed for safety is also presented. This relies on a data base of results obtained when examining foods manufactured and distributed according to practices previously validated by longitudinally integrated (`holistic') quantitative risk analysis. AS

Salmonella

762 Metrick (C), Hoover (DG) and Farkas (DF). Effects of high hydrostatic pressure on heat-resistant and heat-sensitive strains of Salmonella. Journal of Food Science 54(6); 1989; 1547-1549, 1564

Salmonella senftenberg 775W, a heat-resistant strain ($D_{57.5}$ C/ = 15.0 min) and Salmonella typhimurium ATCC 7136, a heat-sensitive strain ($D_{57.5}$ C/ = 3.0 min) were subjected to hydrostatic pressures of 2,380 to 3,400 atm. at 23 C in phosphate buffer (63 mM, pH 7.0) and chicken medium (strained baby food). Survivor curves showed that cell death occurred in this pressure range and increased as pressure increased. Death was greater in buffer than in the chicken medium. S. senftenberg 775 was more sensitive to pressure than S. typhimurium 7136. Injury occurred over the range of pressures for both sp. Recovery at 37 C was possible following pressurization for salmonellae in chicken but not in buffer. AS

Staphylococcus aureus

763 Shelef (LA) and Wang (Z-L). Effects of polyphosphates on cell numbers, enterotoxin A, and extracellular protein in Staphylococcus aureus 196E. Journal of Food Science 54(6); 1989; 1550-1552

Effects of sodium salts of pyro-(SAPP), tripoly- (STPP), and hexametaphosphate (SHMP) on cell numbers, enterotoxin A (SEA) and extracellular protein production (ECP) of Staphylococcus aureus strain 196A were studied in 4% N-Z amine broth plus 1% yeast extract after 24 h at 30 C. At pH 7.0, concn. lower than 56 mM (1.2%) SAPP, 27 mM (1%) STPP or 3 mM (0.4%) SHMP had no antibacterial effects and a bacteriostatic effect showed at slightly higher concn. SAPP was the least effective inhibitor at neutral pH, but displayed enhanced inhibitory effects at pH 5.5. Reduction in SEA and ECP paralleled cell growth suppression; their concn. were 1400 ng/mL and 1.5 mg/mL, resp. In phosphate free broth (9×10^9 CFU/mL), and non-detectable when cell numbers were less than or equal to 10^6 per mL. AS

Fungi

Aspergillus

764 Ogundero (VW). The activities of partially purified acid proteases of thermotolerant Aspergillus species from post harvest oil plam kernels. Nahrung 33(3); 1989; 253-260

The production and activities of extracellular acid proteases of Aspergillus fumigatus Fres. and Aspergillus nidulans (Eidam) Wint were studied. Both sp. grew readily on the palm kernel oil-peptone medium resulting in peak protease production and biomass accumulation occurring within the incubation period of 10 days. Partial purification of the crude protease from the culture filtrate of A. fumigatus on DEAE-cellulose and on Sephadex G-200 gave a single active protease peak being eluted with the protein from at A_{280} A 47-fold purification was achieved with a recovery value of 2.1%. The specific activity (22.4 U/mg protein) of A. fumigatus protease was much higher than that of A. nidulans protease (11.4 U/mg protein). Also, A. fumigatus protease was most active at 40 C and pH 5.8 on casein and on gelatin. A. nidulans protease acted best at 45 C and pH 5.4 on similar substrate. The proteases from both fungi showed no exoprotease activity when used to hydrolyze leucine amide, hippuryl phenylalanine and hippuryl arginine. AS

Mushrooms

765 Beelman (RB), Witowski (ME), Doores (S), Kilara (A) and Kuhn (GD). Acidification process technology to control thermophilic spoilage in canned mushrooms. Journal of Food Protection 52(3); 1989; 178-183

Alternative processes involving the use of citric acid and or EDTA in mushroom canning operations were evaluated and compared to a standard commercial process as means to control thermophilic spoilage. An average of 68% thermophilic spoilage was observed with the standard control process. Spoilage was reduced to an average of 23.9% by the addition of citric acid to the can brine, and to 16.8% when 500 p.p.m. EDTA was also added to the can brine. However, the best results, 2.4% average spoilage, were observed when mushrooms were vacuum hydrated in a buffered citric acid solution (0.05 M, pH 3.5) and EDTA was added to the can brine at 200 p.p.m. equilibrium concn. This treatment was as the Acid-Vacuum Hydration-Chelation (A-VH-C) process. Bacteriological evaluation indicated that the A-VH-C Process caused no significant reduction in product spore load counts (after blanching) compared to the control, but did reduce spore load counts after thermal processing. However, cans from all treatments contained viable spores. Outgrowth studies conducted with spores that survived thermal processing and inoculated into Beef Extract Tryptone Iron (BETI) both indicated that spores from cans processed with the A-VH-C Process had the longest generation time. Similar exp. where the BETI broth was treated to simulate the conditions in the cans indicated that the addition of EDTA to the medium had the greatest effect on reducing outgrowth rate of surviving spores. AS

766 Hollman (PCH), de Jong (WJHJ), Venema (DP), Van Postrum (S) and Herstel (H). Detection of water-binding activities in canned mushrooms. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 188(4); 1989; 337-342

Since 1 October 1987 the use of additives to prevent too much shrinkage of preseved mushrooms has been prohibited in the Netherlands. Therefore, methods have been developed to control canned mushrooms for the presence of these water-binding additives (e.g. egg-white, starches, gums, alginates). Physical methods (viscosity, filtration, flow rate) tentatively studied did not give sufficiently reliable results. Microscopic, immunochemical and chromatographic method were more successful. These methods were developed using reference samples of canned mushrooms with various water-binding agents and were finally tested with blind samples. The methods developed proved to be complementary. With microscopical methods starches can be detected by staining but, among other, alginates are indistinguishable from proteins using a staining technique. Other additives, such as guar gum and microcrystalline cellulose, can be morphologically identified using microscopy. An immunoblot method for the detn. of ovalbumin was adopted in order to determine small amounts of ovalbumin in the surrounding liquid of the mushrooms. The presence of polysaccharides containing water-binding additives such as alginates, pectins and xanthan gum can be detected with gel permeation chromatography is necessary but is hindered by a naturally occurring polysaccharide in the mushrooms. AS

767 Pryke (P). Mushroom packaging. Present and future. Mushroom Journal 196,; 1989;

Hygiene

Acinetobacter

768 Lewis (SJ), Gilmour (A) and Johnston (DE). Factors influencing the detachment of a polymer-associated Acinetobacter sp. from stainless steel. International Journal of Food Microbiology 8(2); 1989; 155-164

The role of an extracellular polymer secreted by an Acinetobacter sp. attached to stainless steel was investigated. Parameters expected to influence polymer conformation, viz. temp. pH, ionic strength and the concn. of Ca and Mg ions, were altered and the resulting detached bacteria enumerated. Increasing both the temp. and pH resulted in increased number of bacteria detached. The effects of increasing the concn. of sodium chloride up to 100mM and magnesium or calcium chloride up to 30 mM were small and, although statistically significant, were considered unlikely to have had major influence on the association of the bacteria with the stainless steel surfaces. Treatments including ultraviolet irradiation of surface-associsted bacteria always resulted in removal of greater numbers of bacteria when compared to treatments where irradiation was not employed. The results indicate that an adhesive extracellular acidic polysaccharide may mediate the attachment of the Acinetobacter sp. to stainless steel. AS

Listeria monocytogenes

769 Conner (DE), Scott (VN), Sumner (SS) and Bernard (DT). Pathogenicity of foodborne, environmental and clinical isolates of Listeria monocytogenes in mice. Journal of Food Science 54(6); 1989; 1553-1556

Foodborne, environmental and clinical isolates of Listeria monocytogenes and other Listeria sp. were screened for pathogenicity in immunocompromised mice. 218 isolates of L. monocytogenes, 203 were pathogenic and 15 were non-pathogenic. All non-monocytogenes sp. were non-pathogenic. Pathogenic isolates were hemolytic for sheep blood. In contrast, many non-pathogenic isolates were weakly hemolytic, but were CAMP positive. Lethal doses (LD_{50}) of pathogenic isolates were 5-480 cells for immunocompromised mice and 7.2×10^5 to 8.4×10^7 for non-immunocompromised mice; whereas LD_{50} for non-pathogenic isolates were $> 10^8$ cells in both immunocompromised and non-immunocompromised mice. Selected test isolates of L. monocytogenes were serotyped; the most common serotypes were 1/2b, 1/2a, 3a and 4b. The initial source and serotype of the isolate appeared not to be related to pathogenicity in immunocompromised mice. However, hemolytic activity was related to pathogenicity. AS

770 Junttila (J), Hirn (J), Hill (P) and Nurmi (E). Effect of different levels of nitrite and nitrate on the survival of Listeria monocytogenes during the manufacture of fermented sausage. Journal of Food Protection 52(3); 1989; 158-161

The fate of L. monocytogenes during the fermentation of Finnish fermented sausage was examined L. monocytogenes was able to survive during a 21 d fermentation of sausage with levels of nitrite and salt commonly used in the meat industry today (120 p.p.m. sodium nitrate and 3.0% NaCl). Initial number of Listeria (10 CFU/g and 10 CFU/g) decreased approx. 1 log 10 CFU/g during the manufacture. Increasing the levels of nitrite/nitrate to those used 30 yrs ago in meat products had a marked effect on the elimination of Listeria. The number of survivors in the sausages was reduced 2.0 log 10 CFU/g during the fermentation of 3 wks with a combination of 200 p.p.m. sodium nitrate and 300 p.p.m. potassium nitrate with 1000 p.p.m. potassium nitrate, the decrease was 3.3 log 10/CFU/g. L. monocytogenes could not be totally eliminated from highly contaminated sausage by increasing only the levels of nitrite and nitrate. Levels of these additives with best bacteriostatic effect on Listeria are no longer permitted in food. AS

BIOTECHNOLOGY

771 Belfort (G). Membranes and bioreactors. A technical challenge in biotechnology. Biotechnology and Bioengineering 33(8); 1989; 1047-1066

Integrating the properties of synthetic membranes with biological catalysts such as cells and enzymes forms the basis of an exciting new technology called membrane bioreactors. The impetus behind this marriage comes from the recent spectacular advances in recombinant DNA and cell fusion technologies and the need to develop competitive bioprocessing schemes to produce complex and active biological molecules. The advantages and limitations of using membrane bioreactors for entrapping whole cells and enzymes are reviewed. Various membrane configurations such as microcapsules, hollow fibers, and flat sheets are compared. Several different entrapped membrane bioreactors, including single, laminated and microporous, for the conversion of optically active enantiomers are described. As with new and exciting technologies, the future of membrane bioreactors in biotechnology will depend on their ability to produce desired molecules at competitive costs. AS

TISSUE CULTURE

772 Watanabe (A). The terminology related to membrane technology. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 36(6); 1989; 525-529 (Ja).

FOOD ADDITIVES

Antimicrobials

773 Tiina (M) and Sandholm (M). Antibacterial effect of the glucose oxidase-glucose system on food-poisoning organisms. International Journal of Food Microbiology 8(2); 1989; 165-174

The antibacterial effect of the glucose oxidase-glucose system was studied on food-poisoning organisms including Staphylococcus aureus, Salmonella infantis, Clostridium perfringens Bacillus cereus, Campylobacter jejuni, Listeria monocytogenes and Yersinia enterocolitica using automated turbidometry. The bacteria were grown in sterile-filtered meat medium which was either raw or heat-denatured. The results showed a clear growth inhibition with combinations of 0.5-1.0 mg/ml glucose and 0.5-1.0 IU/ml glucose oxidase. The growth inhibition was more effective in the heat-denaturated meat medium. The most resistant pathogens were Campylobacter jejuni and Listeria monocytogenes however, growth inhibition was still evident. The possible application of the glucose oxidase-glucose system in food products inhibiting the growth of pathogenes and spoilage organisms is discused. AS

Colourants

Dyes

774 Meyer (RA), Grundig (F), Schafer (R) and Schneider (J). Analysis of synthetic organic food dyes by thin-layer chromatography. Nahrung 33(3); 1989; 261-268 (De).

After presenting a literature survey of the thin-layer chromatography of synthetic organic food dyes the separation of 17 food dyes on cellulose and silica-gel layers by the solvent systems n-propanol/water (67 + 33) and ethyl acetate/methanol/ammonia conc. (60 + 20 + 20) is described. The hRf-values and the detection limits of the individual dyes are given. The spectra of 7 red dyes and the calibration curves of cochineal red and true-red are plotted by means of the thin-layer scanner CS-910. AS

Sweeteners

Sucralose

775 Jenner (MR) and Smithson (A). Physicochemical properties of the sweetener sucralose. Journal of Food Science 54(6); 1989; 1646-1649

The physicochemical properties of the high intensity sweetener, sucralose, (1,6-dichloro-1,6-dideoxy-beta-D-fructofuranosyl 4-chloro-4-deoxy- alpha-D-galactopyranoside) were determined. A high solubility in water (28.3g/100 mL at 20 C) in combination with Newtonian viscosity characteristics, a negligible lowering of surface tension, and no pH effect demonstrated that sucralose was particularly suitable for use in liquid products. The refractive index of aqueous solutions was linear with respect to concn. confirming the usefulness of this technique for determining solution concn. A low octanol-water partition coeff. confirmed that sucralose was poorly soluble in lipids and was, therefore, likely to behave in a similar fashion to sugar in multiphase systems. AS

CEREALS

Oats

Oat flour

776 Guy (RCE), Janes (DA) and Nkwanyuo (WE). Extrusion cooking of oat flours. Flour Milling and Baking Research Association Bulletin 2; 1989;

Oat flour was largely unexpanded a low moisture levels, despite the transition to a method state in the starch granules, because of back of starch in the continuous phase. At high moisture levels, the increasing weakness in the starch granules after melting and swelling led to the formulation of a continuous starch phase and the retention of steam bubbles to form an expanded foam structure. The most favourable conditions for the direct expansion of cereals lies within the low moisture range (below 20% moisture) because the high starch concn. prevent collapse and shrinkage and the extrudates have low moisture contents. SRA

Oat proteins

777 Ma (C-Y), Campbell (C), Khanzada (G) and Modler (HW). Functional characteristics of Wiener-type products substituted with native and acid-hydrolyzed oat protein isolates. Journal of Food Science 54(6); 1989; 1450-1451

Wiener-type products containing 5, 10 and 20% oat protein isolates (OPI), acid-hydrolyzed OPI or legume proteins were prepared and compared to an all-meat control. Cook yields progressively decreased with increases in the level of substitution, but there was no significant differences ($P < 0.05$) among samples containing the same amount of vegetable proteins. Wiener-type products containing acid-hydrolyzed OPI had significantly higher firmness and cohesiveness than those substituted with other vegetable proteins. AS

Rice

778 Cogburn (RR), Hung (HH) and Webb (BD). Survival and development of Sitotroga cerealella (Olive.) on seeds from species of Oryza other than Oryza sativa L. Journal of Stored Products Research 25(3); 1989; 117-123

Fifty accession of wild Oryza spp (those other than Oryza sativa L.) were acquired and grown in pots to increase the seed. Physical and chemical characteristics of the seed were measured. The amylose content of most of the sp. of wild Oryza was high (> 23%) but all were within the range required for cvs rice. Gelatinization temp. also were within required ranges. Therefore, should any of these Oryza spp possess insect or disease resistance, general hardiness, cold-tolerance or other characteristics desirable for new var. of rice, the transfer may be made easier because the cooking quality characteristics (amylose and gelatinization temp. type) of these sp. being within ranges common in commercial var. of rice, would not require alteration. Resistance or susceptibility to Sitotroga cerealella (Oliver) was tested in wild Oryza spp. and in three var. of rice. Survival and developmental time from larvae to adult were the criteria used to assess resistance susceptibility. Insect performance was adversely affected by intact hulls and small seed size. The hull character in wild oryza is no stronger than that previously observed in rice and small seed size is not a viable option as a resistant base. A resistant character of S. cerealella that would justify an attempt to transfer the trait from one sp. to another apparently is not available in the accessions of wild Oryza that were tested. AS

779 Hussain (A), Scanlon (MG), Juliano (BO) and Bushuk (W). Discrimination of rice cultivars by polyacrylamide gel electrophoresis and high-performance liquid chromatography. Cereal Chemistry 66(4); 1989; 353-356

Two methods, polyacrylamide gel electrophoresis and reversed-phase high-performance liquid chromatography, were developed to discriminate 10 different cvs and an advanced line or rice (Oryza sativa L) on the basis of genotype-specific protein patterns. The proteins that were analyzed were extracted from ground brown rice with 5M acetic acid solution. AS

780 Jilani (G), Saxena (RC) and Khan (AA). Ethylene production as an indicator of germination and vigor loss in stored rice seed infested by Rhyzopertha dominica (F). (Coleoptra:Bostrychidae). Journal of Stored Products Research 25(3); 1989; 175-178

Germination and vigor of stored "Taichung Native 1" (TN1) rice seed was significantly reduced by Rhyzopertha dominica (F). infestation. Seed germination decreased by about 34, 51 and 66% with 6, 7 and 8 wks of infestation, resp. Ethylene produced by growing seedling, the shoot length, and dry wt. of seedling grown from infested seeds decreased significantly with an increase in the duration of infestation. Ethylene produced by 4-day-old rice seedlings was highly correlated with shoot growth (r = 0.99) and to a lesser extent with the dry wt. of seedling when 17 days old (r = 0.72). The study revealed that ethylene produced during early shoot growth can be used for comparing insect infestation in rice seed stored under otherwise identical conditions. AS

781 Phillips (S), Mitfa (R) and Wallbridge (A). Rice yellowing during drying delays. Journal of Stored Products Research 25(3); 1989; 155-164

Yellowing of rice during drying delays was monitored in simulated experiments. Freshly harvested wet rough rice and paddy were compared with rice that has been harvested and dried rapidly. One set of 1 tonne heaps of rough rice and paddy, and sacks of rough rice were stored in a godown and another set exposed to the weather on a drying floor for days. Yellow grains (up to 100%) were found in the wet rough rice and paddy at high moisture (> 20% moisture content), associated with a high incidence of mould growth and heating of the grain, within 1 day heating of the heaps occurred, followed by visible mould growth after 2 days and yellowing of grains within 5 days. Rough rice that has been dried rapidly after harvest to 14% MC. produced less than 1% yellow grains. Observations on fungal growth were recorded and fungi were isolated from the rice. These were mainly Humicola lanuginosa(thermophile), Aspergillus fumigatus, Aspergillus flavus, Aspergillus candidus (thermotolerant sp.), Corynaseus sepedonium (sp. of Mucorales) and Pencillium sp. (mesophilic). SGB

782 Proctor (A) and Palaniappan (S). Soy oil lutein adsorption by rice hull ash. Journal of the American Oil Chemists" Society 66(11); 1989; 1618-1621

Rice hull material was converted to an adsorbent of the soy oil pigment, lutein, by a combination of ashing and acid activation. Pigment was adsorbed from a 20% (v/v) soy oil/hexane miscella. The most effective ashing temp. was 500 C. Five per cent acid activation significantly promoted adsorption of the ash, but greater acid activation did not increase adsorption capacity very much. In the system studied, the performance of activated ash was comparable to that of activated bleaching earth. Nonactivated ash also had an ability to bind lutein but was less effective than activated adsorbent. The absorbance spectrum of the residual lutein was not altered by rice hull ash, but was changed when exposed to bleaching clay. AS

Rice bran

783 Takano (K). Studies on the mechanism of lipid-hydrolysing in rice bran. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 36(6); 1989; 519-524 (Ja).

784 Takano (K), Kamoi (I) and Obara (T). Properties and degradation of rice bran spherosome. Studies on some mechanism of lipid-hydrolysing in rice bran. Part IV. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 36(6); 1989; 468-474 (Ja).

This paper describes the properties and the degradation of spherosome in rice bran. The chemical components of rice bran spherosome were; diameters: 1-3 um; lipid content:98.7 %, and protein content:1.3%. The ratio of neutral lipids, glycolipids and phospholipids were 98.6:0.5:0.9. Triacylglycerol (TG), sterylglycoside, and phosphatidylcholine were the major lipid components in the above neutral liplids, glycolipids and phopsholipids, resp. When lipase, phospholipid acylhydrolase, phospholipase C and phospholipase D were added to rice bran spherosome, only phospholipase D degraded it through the enzymatic hydrolysis of phophatidylcholine of the spherosome membrane to phosphatidic acid. It was concluded through this study that at the initial stage phospholipase D reacted with the phospholipid membrane of spherosome to damage its structure, which then allowed TG to get out through the spherosome membrane. After that lipase decomposed TG to free fatty acids. AS

Wheat

785 Al-kahtani (HA). Studies of Saudi Arabian locally produced wheat germ. Food Chemistry 34(2); 1989; 121-130

Local wheat germ (LWG) had higher protein and oil but lower crude fibre, total sugar, and carbohydrates than commercial wheat germ (CWG). Variation in amino acid comp. occurred in both samples. Lab. extracted commercial wheat germ oil (LECWGO) had the highest acid and peroxide values while commercial wheat germ oil (CWGO) was the lowest in unsaponifiable matter. Palmitic, stearic, oleic, linoleic and linolenic acid were found. Local wheat germ oil (LWGO) was the richest in alpha- and beta- tocopherols. Gamma- tocopherol was only found in CWGO. AS

786 Tuma (D), Sinha (RN), Muir (WE) and Abramson (D). Odour volatiles associated with microflora in damp ventilated and non-ventilated bin-stored bulk wheat. International Journal of Food Microbiology 8(2); 1989; 103-109

Western hard red spring wheat, stored at 20 and 25% moisture contents for 10 months during 1985-86 was monitored for biotic and abiotic variables in 10 unheated bins in Winnipeg, Manitoba. The major odour volatiles identified were 3-methyl-1-butanol, 3-octanone and 1-octen-3-ol. The production of these volatiles was associated and correlated with microfloral infection. Ventilation, used for cooling and drying of grain, disrupted microfloral growth patterns and production of volatiles. The highest levels of 3-methyl-1-butanol occurred in 25% moisture content wheat infected with bacteria, Penicillum spp. and Fusarium spp. In non-ventilated (control) bins with 20% moisture content wheat, 3-methyl-1-butanol was correlated with infection by members of the Aspergillus glaucus group and bacteria. In control bins, 1-octen-3-ol production was correlated with infection of wheat of both moisture contents by Penicillum spp. The fungal sp. isolated from damp bin-stored wheat and tested for production of odour volatiles on wheat substrate, included Alternaria alternata (Fr.) Keissler, Aspergillus repens (Corda) Saccardo, A. flavus Link ex Fries, A. versicolor (Vuill) Tiraboschi, Penicillum chrysogenum Thom, P. cyclopium Westling, Fusarium moniliforme Sheldon, F. semitectum (Cooke) Sacc. In the lab. fungus-inoculated wheat produced 3-methyl-1-butanol, 3-octanone and 1-octen-3-ol were also produced, but less frequently. Two unidentified bacterial sp. isolated from damp wheat and inoculated on agar produced

3-methyl-1-butanol. AS

Wheat flour

787 Harland (BF) and Forlich (W). Effects of phytase from three yeasts on phytate reduction in Norwegian whole wheat flour. Cereal Chemistry 66(4); 1989; 357-358

788 Inakuma (T), Aibara (S) and Morita (Y). The role of glutenin and gliadin in physical dough properties of wheat flour. Comparison of farinograph properties of durum and bread wheat flours. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 36(6); 1989; 437-447

The influence of added proteins (gliadin and glutenin) on the farinograph parameters of dough was investigated with three kinds of wheat flours (hard wheat flour, soft wheat flour and durum wheat flour). by the addition of gliadin, similar changes in the quality were observed for all three wheat flour; an increase in protein content was accompanied by an increase in the max. consistency concomitant with a decrease in the farinograph peak time and a marked decrease in the tolerance index. In the case of glutenin, on the other hand, the values of the tolerance index were reduced, and the farinograph peak time of durum wheat flour was extended by increasing protein content, although that of the other flours showed a similar tendency when gliadin was added. A synthetic flour dough consisting of starch and isolated gliadin or glutenin resulted in the poor quality doughs. Microscopic examination of the gluten matrix of the synthetic flour dough containing either gliadin or glutenin did not reveal the presence of an extended network structure observed in natural wheat flour doughs. The durum wheat flour dough had a relatively large network structure of gluten matrix, and was of low farinograph absorption. However, it required a long time to form the network structure, which was stable as compared with those of the bread wheat. It is also suggested that the quantity of immobilized water in the doughs is controlled by gliadin in the gluten matrix, although the capacity of the immobilized water essentially depends on the characteristics of glutenin. AS

Wheat proteins

789 Orsi (F) and Pallagi (E). Relation of SDS soluble and insoluble wheat protein fractions to flour quality. Nahrung 33(3); 1989; 231-239 (De).

The quality of wheat to prepare bread and pastry products is determined in the first place by the quantity and quality of proteins. The proteins of 38 flour samples were extracted by 1.5% SDS and 5% beta-mercaptoethanol. The protein extracts were separated by HPLC on TSKG 3000 SW column and the proteins were measured at 280 nm by UV detector. The correlations between the macro quality characteristics (loaf vol. and valorigraph value) and the comp. of the protein fractions were investigated by multivariate statistical procedure. A good estimation of loaf vol. and valorigraph value was possible from the quantity of fractions. AS

MILLETS

Corn

790 Weller (CL), Paulsen (MR) and Mbuvi (S). Germ weight, germ oil content, and estimated oil yield for wet milled yellow dent corn as affected by moisture content at harvest and temperature of drying air. Cereal Chemistry 66(4); 1989; 273-275

A split-plot experimental design was used to determine the effect of moisture content at harvest and temp. of drying air on wt. oil content, and estimated oil yield of corn germs recovered from lab. wet milling. The effects were determined for a high-yield hybrid of yellow dent corn widely grown in the corn belt that was hand-picked and hand-shelled. Germ oil content decreased significantly as moisture content at harvest and temp. of drying air increased. Germ wt. and estimated oil yield generally decreased as both moisture content at harvest and temp. of drying air increased from 17.2 to 29.6% and 22 to 93 C resp. A

Sorghum

791 Lai (MN), Wang (HH) and Chang (FW). Thermal diffusivity of solid mash of sorghum brewing. A solid state fermentation. Biotechnology and Bioengineering 34(10); 1989; 1337-1340

Sorghum liquor brewing is a typical Chinese traditional process of solid-state fermentation. The value of thermal diffusivity of sorghum mashes during fermentation is needed to predict the value of thermal conductivity to provide pertinant data for the design of bioreactors. This study indicated that the change of thermal diffusivity of sorghum mashes is not sensitive to the fermentation time. GAR

792 Phillips (RD) and Falcone (RG). Extrusion of sorghum and sorghum-peanut mixtures. Effect of barrel temperature and feed moisture on physical- textural characteristics. Journal of Texture Studies 19(2); 1989; 185-197

Sorghum and 85% sorghum-15% full-fat peanut meals were extruded over a range of barrel temp. (160-205 C) and feed moistures (13-25%) in a pilot-scale machine. The resulting products were characterized for physical and textural properties. Resulting data were fit to third order models and the corresponding response surfaces plotted. For both comp., max. expansion and min. density and textural strength occurred at low-to-medium temp. and moisture. Some extrudates compared favourably with commercial snack products. The addition of full-fat peanut to sorghum meal enhanced the expansion and tenderness in the optimum range. A 70% sorghum - 30% full fat peanut mixture could not be extruded successfully. AS

793 Yousef (AMM), Moharram (YG), Moustafa (EK) and Bolling (H). Tannin and non-tannin polyphenolic compounds of the Egyptian sorghum grains. Nahrung 33(3); 1989; 269-274

The fractionation and properties of the polyphenolic compounds of the Egyptian sorghum grains were studied. The results showed that sorghum grains contained a higher amount of non-tannin polyphenols than tannin ones. By utilizing the funnel separation technique higher recovery for both tannin and non-tannin polyphenol fractions was given compared with the Sephadex L H 20 column chromatography method. The refractination of both fractions using TLC technique showed that each fraction of tannin and non-tannin composed of different compounds differed in their properties. AS

PULSES

794 Chang (KC), Chang (DC) and Phatak (L). Effect of germination on oligosaccharides and non-starch polysaccharides in navy and pinto beans. Journal of Food Science 54(6); 1989; 1615-1619

Effect of germination on raffinose-oligosaccharides, and non-starch polysaccharides in C-20 navy and Pindak pinto beans was investigated using solvent fractionation and chromatographic methods. Approx. 70-80% of total raffinose and stachyose was removed by germination for 6 days. Ungerminated navy and pinto beans contained 21.75% and 18.84% total non-starch polysaccharides, resp. Germination did not significantly change in yields of soluble and insoulble non-starch polysaccharides. Arabinose in the soluble non-starch polysaccharides was significantly increased by germination. Germination increased the viscosity of soluble non-starch polysaccharides. However, the viscosity of soluble non-starch polysaccharides from germinated pinto beans was significantly greater than that from germinated navy beans. AS

African locust beans

795 Ikenebomeh (MJ). The influence of salt and temperature on the natural fermentation of African locust bean. International Journal of Food Microbiology 8(2); 1989; 133-139

Variations in salt (NaCl) content and temp. influenced the microbial development and organoleptic quality of fermenting African locust bean (Parkia filicoidea Welw.) seeds. The influences on microbial growth by different salt contents and temp. were followed by changes of pH and titratable acidity. A 1% (w/w) salt addition and fermentation at 37 C improved the organoleptic quality of the product. Salt additions above 3% (w/w) and temp. below 25 C resulted in lower microbial counts, low pH and titratable acid values; fermentation of the processed substrate of African locust bean seeds was inhibited and the organoleptic quality was poor. The predominant microorganisms present throughout the fermentation was a Bacillus sp. with characteristics similar to Bacillus subtilis. AS

Butter beans

796 Lopez (A) and Williams (HL). Essential elements in dry and canned butter beans (Phaseolus limensis L.). Journal of Food Protection 52(3); 1989; 204-206

Ten essential elements were determined in dry and canned butter beans (Phaseolus limensis L) by atomic absorption spectrophotometry. Samples were taken at different stages during the canning process to determine where changes in element content occurred. The content of each samples was compared statistically to other samples taken within the process. Element retention, excluding chloride and sodium, ranged from 51 to 84% on a dry wt. basis, and 14 to 24% on wet wt. basis. AS

Cowpeas

797 Don-Pedro (KN). Effects of fixed vegetable oils on oviposition and adult mortality of Callosobrochus maculatus (F.) on cowpea. International Pest Control 31(2); 1989; 34-37

The mechanisms of action of fixed vegetable oils in reducing progeny development of Callosobrochus maculatus on cowpea were investigated. When all cowpea grains were treated with groundnut and traditional coconut oils, oviposition by mated females was not affected although there was significant subsequent egg mortality. However, in a two-way choice exp., C. maculatus showed a strong oviposition preference for grains not treated with oils. In general, fixed vegetable oils applied at rates of up to 14 ml/kg substrate were shown to have no direct toxicity against adults of C. maculatus, thus explaining normal oviposition in no-choice situation. It was concluded that the main toxic action of fixed vegetable oils was against eggs and that a uniform spread of oils on all grains would be necessary to maximise effectiveness. AS

798 Fashakin (JB) and Ojo (FA). Chemical composition and nutritive changes of some improved varieties of cowpea (Vigna unguiculata) (L. walp). 2. New breeds of varieties from the international institute for tropical agriculture, Ibadan, Nigeria. Tropical Science 28(3); 1988; 191-199

Following the work described in part 1. 10 new var. of cowpea (Vigna unguiculata) were assessed in terms of chem. comp. and other proximate analysis. Physical and organoleptic properties were also assessed. The results indicated that the new var. contained high levels of Fe, Ca, Cu, and proteins, in conformation of previous reports. The protein content ranged from 20.9% to 26.9% and Fe content ranged between 16.02 and 22.51 mg/100 g. Although the levels of Ca were relatively high, with a range of 16 to 24 mg/100g, dietary supply of this nutrient could be hampered by the limited availability of Ca in legumes. On the whole, taste panel acceptability did not reflect chem. comp. as much as physical properties relating to colour, texture and soaking time. It was concluded that some of the var. under investigation were quite suitable for use in the developing countries in terms of nutritional adequacy and consumer acceptability. AS

799 Ningsanond (S) and Ooraikul (B). Dry and wet milling of red cowpea. Canadian Institute of Food Science and Technology Journal 22(1); 1989; 25-33

Red cowpea flours, starch and protein were prepared using dry and wet processing methods. At optimum conditions, dry dehulling with an abrasive dehuller gave 75% yield of dehulled seeds with 30% hull remaining and 18% cotyledon loss compared with 70% yield, 2% hull remaining and 20% cotyledon loss from wet dehulling of soaked seed (8-10 h at 30 C) using a stone mill with 3.5 mm clearance. There was little difference in chem. comp. between flour made from either dry or wet dehulled seeds. Double air classification of dry-dehulled flour produced starch and protein fractions with separation efficiencies of 94.0 and 72.6%, resp. This resulted in 61.5% yield with 94.0% recovery for starch and 38.5% yield with 72.6% recovery for protein. Fat, minerals, dietary fiber, sugars and damaged starch were air classified along with the protein fraciton. Wet processing of whole seeds produced starch with an average yield of 34.1% with 75.4 recovery and protein isolate with an average yield of 19.4% with 63.8% recovery. No damaged starch was found in starch isolated by wet process. AS

Green beans

800 Aparicio-Cuesta (P), Rivas-Gonzalo (JC), Santos-Buelga (C) and Garcia-Moreno (C). Quality of frozen green beans (Phaseolus vulgaris) subjected to different storage conditions. Journal of the Science of Food and Agriculture 48(2); 1989; 249-259

This work describes the changes in the vitamin C chlorophylls and carotenoids and the sensory characteristics of the frozen green beans (Phaseolus vulgaris) subjected to different storage conditions. Frozen green beans were stored at -22 C and under satisfactory conditions with temp. fluctuations and at room temp. It was seen that during storage at -22 C 68% decrease occured in vitamin C after 30 months. The pigments also decreased but the time course is irregular and its sensory quality remained acceptable for atleast 15 months at -22 C. Under unsatisfactory conditions the content of the compounds decreased resulting in deterioration of sensory quality. Under fluctuating temp. deterioration is most evident as a decrease in flavour characteristics and increases in the loss of outer cuticle of the beans when boiled. NGKR

Mung beans

801 Sattar (A), Durrani (SK), Mahmood (F), Ahmad (A) and Khan (I). Effect of soaking and germination temperatures on selected nutrient and antinutrients of mungbean. Food Chemistry 34(2); 1989; 111-120

Effects of different temp. during soaking and germination on selected nutrients and antinutrients of mungbean, were studied. Comparison of the coeff. of variability revealed striking differences in their values as a result of soaking and germination. Soaking at 55 C resulted in larger decreases in the phytate and trypsin inhibitor activity than at 27 C whereas protein was little affected. Biosynthesis of protein, ascorbic acid and riboflavin protein was generally greater, and biodegradation of phytate and trypsin inhibitor higher, during germination at ambient conditions(20-35 C) than at low temp. (20 C) while thiamine and amino acid contents were less affected. Max. contents of ascorbic acid (47.0 mg/100g), riboflavin (3.54 ug/g) and thiamine (4.37 µg/g) were detected during germination for 48-72 h irrespective of temp. A slight increasing trend in the protein content (18.4-23.5%) but decreasing trends in the phytate (216-105 mg/100 g) and trypsin inhibitor (2460-497 TIU/g) values, were observed during germination regardless of the temp. tested. AS

Peas

Pea starch

802 Haase (NU) and Kempf (W). Notes on the quality of pea starch. Starch/Starke 41(2); 1989; 49-54 (De).

Starch from 4 var. each of two subsp. viz sativum (smooth) and Medullane (wrinkled), pea (Pisum sativum) have been studied. Smooth peas contained 50% starch (dry basis) whereas it was about 30% (db) in wrinkled peas. Smooth pea starch contained 50% granules of smaller size (dia < 20 µm) as compared to wrinkled pea starch which had 100% small granules. The swelling power of smooth pea starch was higher than that of wrinkled pea, but their solubilities were not significantly different. SZA

Winged beans

803 Bello (AB) and Okezie (BO). Effect of extraction conditions on the extractability of winged bean (Psophocarpus tetragonolobus (L) DC) proteins. Journal of Food Science 54(6); 1989; 1656-1657

Protein extractability from defatted winged bean flour was studied under various conditions of pH (2, 4, 6, 8, 10, 12) temp. (15, 30, and 45 C) and time (10, 20, 30 min). Results indicated that protein extractability was strongly pH dependent. Max. protein extractability was attained at pH 12 while the min. extractability occurred at pH 4. Protein extractability was not significantly affected at the various temp. and time combinations; however, when extraction time was extended (at 15 min increments) from 30 min to 120 min. Significantly higher (15%) protein was extracted at 30 C after an additional 60 min. Increasesd solvent-to-flour ratios resulted in increased protein extractability, but increased salt (NaCl and CaCl) concn. (IM) decreased extractability. AS

OILSEEDS AND NUTS

Almonds

804 Schirra (M) and Agabbio (M). Influence of irrigation on keeping quality of almond kernels. Journal of Food Science 54(6); 1989; 1642-1645

Quality and chem. changes were determined in almond kernels (Prunus amygdalus) stored for 12 months under simulated warehouse conditions after being harvested from irrigated and non-irrigated trees. The chem. and physical characteristics of the extracted oil differd greatly among the 6 cvs tested. Irrigation and storage significantly influenced quality of the kernels and stability of the oil. Autooxidation during storage was closely correlated with the degree of unsaturation in the oil extracted at harvest time. Free fatty acid content, saponification values and spectrophotometric indices of the oil after 12 months' storage revealed greater oxidative alterations in the kernels from irrigated plots than in non-irrigated ones. AS

Cashewnuts

805 Muturi (P) and Arunga (RO). Cashewnut shell liquid. A review of production and research in Kenya. Tropical Science 28(3); 1988; 201-218

The cashew tree(Anacardium occidentale L.) has been grown in Kenya, mainly as a source of cashewnuts. One of its by-products, with considerable potential in industrial processing, is cashewnut shell liquid (CNSL). However there has not been significant production of this, either for local or export markets. Full advantage has not, therefore, been taken of the crop. Only a small fraction of the cashewnut shell liquid is extracted during the roasting of the nut. Subsequently the shell is thrown away as waste. This paper presents a historical review of the cashewnut industry, with emphasis on the potential production of cashewnut shell liquid in Kenya and reports briefly on a few experimental studies aimed at developing secondary commercial products from CNSL. Various methods of extracting the liquid from the shell are reported, and formulations for coating materials based on CNSL are described. Physical and performance characteristics similar to those of existing commercial products can be achieved. AS

Groundnuts

806 Hao (DY-Y) and Brackett (RE). Growth and survival of Flavobacterium aurantiacum in peanut milk. Journal of Food Protection 52(3); 1989; 165-168

Tryptone-yeast extract-glucose (TYG) and trypticase soy broth (TSB) were evaluated for production and recovery of Flavobacterium aurantiacum stationary phase cells. In addition, growth of F. aurantiacum in peanut milk was tested. Trypticase soy broth was chosen as the best medium for producing stationary phase cells. Both non-defatted peanut milk (NDPM) and partially defatted peanut milk (PDPM) supported growth of F. aurantiacum. The growth of F. aurantiacum in both kinds of peanut milk was not inhibited by aflatoxin B_1 (1 mg/ml). About 10^{4} stationary phase cells were inoculated in 0.067 M phosphate buffer (PB) at pH 5.0, 5.5, 6.0, 6.5, and 7.0 and in both peanut milks (pH 6.3 and 6.9). After a 24 h incubation period, the viable cell number decreased slightly in PB (pH 7.0 30 C), but decreased 2-3 logs in other buffers. About 0.6-0.8 log decrease was observed in NDPM and PDPM. Phosphate buffer (0.067 M, pH 7.0), NDPM and PDPM were determined to be adequate for use in studies to investigate the removal of aflatoxin B_1 by F. aurantiacum. AS

807 Moss (JR) and Otten (L). A relationship between colour development and moisture content during roasting of peanuts. Canadian Institute of Food Science and Technology Journal 22(1); 1989; 34-39

The colour data showed that the major changes in colour development occurred after about 6 to 8 min. of roasting. At this time the values of the a and b colour scales increased rapidly, while those of the L scale decreased. The results of the study appear to indicate that the development of both L and a colours- which represent the degree of lightness and the red-green range, resp. depends on the characteristics of the unroasted nuts. In particular, it is suspected that the maturity of the nut is important in determining the L and a values. The results also showed that the b colour which represents the yellow-blue range was not affected by the source of the samples. Therefore, the data of both Test Sets could be combined and correlated with the moisture content for a roasting temp. range of 157 to 171 C. AS

808 Rubico (SM), Phillips (RD), Resurreccion (AVA) and Beuchat (LR). Nutritional, microbiological, and sensory qualities of a peanut beverages prepared using various processes. Journal of Food Science 54(6); 1989; 1540-1543

Nutritional, microbiological and sensory qualities of peanut beverages processed at 85 , 100 and 121 C for 15 min and 121 for 3 min were determined. Heating improved the digestibility of peanut beverages, particularly those processed at 121 C for 3 sec and 85 C for 15 min. Methionine was particularly sensitive to the treatment at 121 C. The limiting amino acids were threonine, cystine, valine, lysine and tryosine. No microbial growth was observed in products processed at 100 C and 121 C followed by storage at 4 C and 30 C for 20 days. Beverage processed at 85 C and 30 C for 3 days contained an aerobic microbial population of 2.4×10^{4} CFU/mL. The beany flavour was least pronounced in beverages processed at 100 C for 15 min and strongest at 121 C for 3 sec. AS

Soybeans

809 Ali Asbi B, Wei (LS) and Steinberg (MP). Effect of pH on the kinetics of soybean lipoxygenase-1. Journal of Food Science 54(6); 1989; 1594-1595, 1600

The influence of pH on the kinetics of soybean lipoxygenase-1 was examined. Lipoxygenase-1 was stable when preincubated in the pH range for 3.2 to 9.2 but was irreversible denatured at pH 3.0 and below. Double reciprocal plots for undenatured enzyme in the pH range 5.6 to 9.2 showed that the enzyme obeyed Michaelis-Menten kinetics in this pH range. The Dixon plot (log $v_{max} K_m$ vs pH) indicated an active site of the free enzyme to be a histidine residue with a pK of about 7.3. AS

810 Matoba (T), Sakurai (A), Taninoki (N), Saitoh (T), Kariya (F), Kuwahata (M), Yukawa (N), Fujino (S) and Hasegawa (K). n-Hexanol formation from n-hexanal by enzyme action in soybean extracts. Journal of Food Science 54(6); 1989; 1607-1610

n-Hexanal in soybean homogenates decreased during incubation at alkaline pH. When soybean extracts were dialyzed and then incubated with n-hexanal and cofactors [nicotinamide adenine dinucleotide (NAD+), the reduced from (NADH), nicotinamide adenine dinucleotide phosphate (NADP+), and the reduced from (NADPH)], NADH and NADPH stimulated the enzymatic reduction of n-hexanal with NADH being more effective than NADPH. When undialyzed preparations were incubated, all the cofactors stimulated enzymatic activity, with NADH being the most effective. The reaction product in all the incubation mixtures was n-hexanol; n-hexanal was reduced to n-hexanol stoichiometrically. It was suggested that alcohol dehydrogenase was responsible for the decrease of n-hexanal in soybean homogenate at alkaline pH. AS

811 Petres (J) and Czukor (B). Investigation of the effects of extrusion cooking on antinutritional factors in soybeans employing response surface analysis Part 1. Effect of extrusion cooking on trypsin-inhibitor activity. Nahrung 33(3); 1989; 275-281

A Brabender 20 DN lab. scale extruder was used to study the effect of processing parameters on trypsin-inhibitor activity in dehulled soybeans employing response surface analysis. Process variables examined were: Temp. of die (150, 160 and 170 C), feed moisture content (12, 16 and 20 C) and screw speed (80, 120 and 160 rpm). Trypsin-inhibitor activity of extruded products was measured. The correlation with a multiple detn. coeff. (R^2 = 0.976) and the mathematical model developed in this study were found to be significant. AS

812 Yoshida (H) and Kajimoto (G). Effects of microwave energy on the tocopherols of soybean seeds. Journal of Food Science 54(6); 1989; 1596-1600

The effects of microwave heating on the tocopherols of soybeans were studied in relation to chem. changes in the lipids. The amounts of alpha-, beta-, gamma- and delta- tocopherols in the soybeans before microwave treatment ranged from 6.2 to 13.0, 2.7 to 4.5 60.0 to 76.8 and 45.7 to 57.9 mg/100 g lipid, resp. gamma- and delta-tocopherol concn., gradually decreased, and as much as 40% of the tocopherols originally present in the soybeans was lost after 12 min heating. However, microwave treatment of soybean of 6 min, which would be optimal to prepare full-fat soy flour without a burnt odour, retained ca. 90% of the individual tocopherols with a few exceptions and caused no significant difference in the chem. changes of the lipids. AS

Soy products

Soy curd

813 Gandhi (AP) and Bourne (MC). Effect of pressure and storage time on texture profile parameters of soybean curd (Tofu). Journal of Texture Studies 19(2); 1988; 137-142

The pressure applied to soybean curd during processing into tofu has a profound effect on the moisture content, yield and some textural parameters of tofu. As the pressure increased from 0.186 P to 0.744 P the moisture content decreased from 82% to 60% and yield decreased from 2.0 kg to 1.2 kg per kg whole dry soybeans. Hardness-1, hardness-2, chewiness and gumminess increased linearly with increasing pressure. Springiness, cohesiveness, adhesiveness and stringiness were hardly affected by increasing pressure. During storage in water at 2 - 3 C for 3 wks, hardness, gumminess, and adhesiveness increased moderately; springiness decreased moderately and the other texture parameters were almost unchanged. AS

Soy milk

814 Murata (K), Kobayashi (H), Kusakabe (I), Teramoto (H) and Murakami (K). Preparation of fermented soy milk curd with commercial proteinases. Journal of the Japanese Society of Food and Nutrition '(Eiyo to Shokuryo') 36(5); 1989; 417-423

Soy milk curd was prepared by using three kind of proteinases having soy milk-clotting activity (subtilisin, thermolysin and bromelain) as a coagulant followed by lactic acid fermentation. Among these fermented soy milk curds, the curd made with thermolysin showed a little high moisture content than the other. On the other hand, the curd made with bromelain had a little higher protein recovery and yield than the others. In order to estimate the extent of proteolysis in fermented soy milk curd, analyses were made on electrophoretic patterns, the ratio of water soluble nitrogen to total nitrogen, and free amino acid content. The results of these exp. showed that thermolysin and subtilisin hydrolyzed the protein in fermented soy milk curd more than bromelain did. None of the soy milk curd which was fermented for 2 wks developed bitterness or rancidity. The fermented soy milk curd made with thermolysin was slightly superior in texture (smoothness) to that made with the others. The results of this study suggest that thermolysin, as compared with subtilisin and bromelain, is more suitable for making fermented soy milk curd with respect to proteolysis and texture (smoothness). AS

Soy proteins

815 Chung (S) and Villota (R). Binding of alcohols by soy protein in aqueous solutions. Journal of Food Science 54(6); 1989; 1604-1606

Interactions of alcohols with soy protein isolate were investigated using an equilibrium dialysis method. It was found that interactions may involve hydrophobic association and to some degree, hydrogen bonding. Studies with soy protein with various levels of denaturation indicated that denaturation of the protein by heating may limit its ability for the formation of hydrogen bonds with alcohols. The proteins under investigation exhibited practically unlimited binding capacity for alcohols. AS

TUBERS AND VEGETABLES

Root vegetables

Cassava

816 Adisa (VA). Amylase activities and cyanide tolerance of five cassava tuber spoilage molds. Nahrung 33(3); 1989; 297-302

Studies on the amylase activities and tolerance to cyanide by five spoilage molds of cassava tuber were carried out. None of the test fungi grew in 0.1 g/ml concn. of potassium cyanide while only Aspergillus aculeatus and A. niger grew in 0.05 g/ml. Except for B. theobromae, all the other four molds synthesised amylases on the 2nd day of incubation. Highest amylase activities by the molds were recorded between pH 6-7 and at 25 C. The molds degraded satisfactorily the raw starch and protein contents of the blended cassava tuber pulp. Total reducing sugars were detected in large quantities from the mold deteriorated cassava tuber. AS

817 Lopez-Ulibarri (R), Huerta (S), Schettino-Bermudez (B) and Gutierrez-Rojas (M). Gelatinization of cassava meal for solid state fermentation. Journal of Food Engineering 9(3); 1989; 237-243

Solid substrate fermentation (SSF) of cassava meal for protein enrichment with Aspergillus niger requires pregelatinization to facilitate its microbial assimilation. Studies on a lab. scale (50-100 g) showed that the product has a suitable texture of SSF when cassava meal had been heated indirectly and 5% (v/w) of edible vegetable oil was added. In this work, a conventional mixer was modified for use as a gelatinization reactor (10-15 kg of dry material). This mixer has a built-in horizontal stirrer and a jacket heated with saturated steam. It was found that with a residence time of 20-25 min, a temp. of 96 C and a stirrer speed of 12.8 r.p.m. the degree of gelatinization reached in the lab. trials could be reproduced and, subsequently, a max. protein increase by SSF of 9.5% with A. niger could be achieved. AS

Cassava starch

818 Ghildayal (NP), Ramakrishna (M) and Lonsane (BK). Comparative economics of the production of high fructose syrup from cassava chips and cassava starch. Starch/Starke 41(2); 1989; 64-68

Although high fructose syrup (HFS) conforming to standards is obtained from cassava chips converted to flour the comparative economics showed that the gain of lower expenses on raw material by use of chips instead of starch are completely upset by the higher capital investiment as plant and machineries as well as higher expenses on activated carbon and steam. The use of cassava flour also imposed many limitations and problems upon the process operation. The direct utilization of cassava chips, as compared to starch, is therefore not commercially viable for the production of HFS. SZA

819 Osunsami (AT), Akingbala (JO) and Oguntemein (GB). Effect of storage on starch content and modification of cassava starch. Starch/Starke 41(2); 1989; 54-57

Yield of starch from fresh roots (24.4%) was significantly greater than the yield (16.7%) from roots stored at room temp. for 6 days. The isolated starch was treated with different concn. of hydrochloric acid to produce thin boiling and dextrinized starch, and different concn. of acetic anhydride to produce acetylated starch. The alkali number of thin-boiling and dextrinized starches increased with acid treatment while viscosity decreased. The degree of substitution, in case of acetylated starch, increased with concn. of acetic anhydride. The cold water solubility of acid thinned and acetylated starches was similar to that of native starch while it increased for dextrinized starches with acid concn. The viscosity of acetylated starches increased with degree of substitution. SZA

Vegetables

820 Fieschi (M), Codignola (A) and Luppi Mosca (AM). Mutagenic flavonol aglycones in infusions and in fresh and pickled vegetables. Journal of Food Science 54(6); 1989; 1492-1495

Free flavonol aglycones, potentially mutagenic, were determined in vegetable infusions, in fresh and pickled vegetables and in vegetables exposed to mold growth. None of the infusions tested contained any considerable amount of free mutagenic aglycones, but some vegetables, such as red onions and cucumbers, and appreciable amounts of free flavonol aglycones, especially in the external layers. The treatment used in the production of pickled vegetables did not change the quality and quantity of the flavonols but the presence of molds altered the quantity of flavonol aglycones and glycosides. AS

Leafy vegetables

Cabbages

821 Onoda (A), Koizumi (T), Yamamoto (K), Furuya (T), Yamakawa (H) and Ogawa (K). A study on variable low pressure storage for cabbage and turnip. Journal of the Japanese Society of Starch Science '(Denpun Kogyo Gakkaishi') 36(5); 1989; 369-374 (Ja).

The variable low pressure storage (VLPS) that regulates the different pressures P_1 and P_2 during storage in a chamber possesses advantages on the supply of oxygen gas into the chamber and the exclusion of carbon dioxide gas from it because of changing inner pressures periodically storage tests were done in order to compare VLPS with ordinary low pressure storage, using cabbage and turnip. The pressure P_1 was set up the 100 mmHg, and the other Pressure P_2 was set up the 300 mmHg at these tests. VLPS was superior to the ordinary low pressure storage in the ratio of wt. loss or the appearance of both cabbage and turnip. The VLPS system did not require a moisture implement because the inlet air to the chamber was saturated instantly with water vapour which was produced by respiration or evaporation from cabbage or turnip. AS

Melons

Cucumbers

822 Kuo (S-H) and Parkin (KL). Chilling injury in cucumbers (Cucumis sativa L.) associated with lipid peroxidation as measured by ethane evolution. Journal of Food Science 54(6); 1989; 1488-1491

The development of chilling injury in cucumbers stored at 4 C and 95% RH was evaluated. Irreversible damage due to chilling required 7 to 10 days as indicated by increases in tissue electrolyte leakage (from 30 to 70%), stress ethylene production (to 30-60ρ mol g^{-1} hr^{-1}) and visual manifestations of injury. Low levels of ethane evolution (1ρ mol g^{-1} /hr^{-1} were observed for unchilled and continuously chilled fruits. Upon rewarming, ethane evolution was stimulated by an order of magnitude following a prior chilling exposure of at least 7 days. These results indicate that the potentiation of lipid peroxidation in chilled cucumbers is associated with the onset of irreversible injury. AS

Tomatoes

823 Cameron (AC), Boylan-Pett (W) and Lee (J). Design of modified atmosphere packaging systems. Modeling oxygen concentration within sealed packages of tomato fruits. Journal of Food Science 54(6); 1989; 1413-1416, 1421

A method was developed for detn. of oxygen consumption as a function of oxygen concn. by mathematical characterization of oxygen depletion by a tomato fruit in a closed system with time. Mathematical equations were developed describing oxygen consumption as a function of oxygen concn. for breaker, pink and red tomato fruit and were used to model film permeability characteristics (oxygen permeability coeff. surface area, thickness) as a function of fruit wt. to achieve desired sealed package concn. of oxygen in modified atm. packages. Equations were also developed to describe the time for initial oxygen establishment as affected by void vol. Calculations are presented for optimizing package parameters for tomato fruit. AS

824 Upasana Rani and Bains (GS). Physico-chemical and pectic changes in ripening tomato cultivars. Tropical Science 28(3); 1988; 185-189

Composition and pectolytic changes in two tomato cvs., `Pb. Chhuhara' and `Pb. Kesri', at the green intermediate and red-ripe stages were investigated. Lycopene content of the ripened tomato showed a spectacular increase. The oval shaped Pb. Chhuhara' tomato contained a higher percentage of alcohol-insoluble solids than the roundish `Pb. Kesri' tomato. Water soluble pectin predominated fin both the cvs. but `Pb. Chhuhara' exceeded substantially that of `Pb. Kesri'. `Pb. Chhuhara' was judged to be the commercially superior var. AS

FRUITS

825 Gemma (H), Oogaki (C), Fukushima (M), Yamada (T) and Nose (Y). Preservation of some tropical fruits with an apparatus low pressure storage for practical use. Effect of low pressure storage on fruits and vegetables. Part I. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 36(6); 1989; 508-518

Effect of low pressure was investigated on the preservation of avocado and papaya fruits with a view of applying this technique to the storage of fruits by using a practical apparatus. Effects of a low partial pressure of oxygen at a low temp. were clearly demonstrated on the retardation of ripening, prevention of deterioration and decay compared with normal pressure storage at a low temp. The maturity of papaya fruit stored at a low pressure and low temp. was delayed for 3 wks compared with the fruits kept at a normal pressure and low temp. during 40 days storage, when the fruits used were immature at the time of harvest or prior to transporation. The firmness and the peel colouration of the papaya fruits could be kept in better condition during 40 days storage period by treatment with hot water dips, than those of the fruits not subjected to hot water dips. AS

Apples

826 Bains (MS), Ramaswamy (HS) and Lo (KV). Tray drying of apple puree. Journal of Food Engineering 9(3); 1989; 195-201

This study was undertaken to investigate the influence of different factors on the drying rate of apple puree in a cabinet air drier and to suggest optimum operating conditions for obtaining a good quality fruit leather . In this connection the drying of apple puree in a forced air circulation cabinet drier with a cross flow tray arrangement was evaluated using a 3 x 2 factorial design of exp. involving air temp. (70 C and 94 C) flow rate (2.0 and 4.1 m/s) and R.H. (5 and 15%) as main factors. With the help of drying curves the influence of these factors on the rate of moisture removal was studied as well as to predict the time required to dry the product to a final moisture content of 20% (dry basis). The results revealed that a two stage drying operation involving a high temp., low humidity and high flow rate combination in the first stage followed by a lower temp. finish drying was found to yield a better product. NGKR

827 Bin (F) and McLellan (MR). Effect of sample weight and orientation on the texture press force of apple slices. Journal of Texture Studies 19(2); 1988; 153-160

Texture measurements of both fresh apple slices and steam-blanched apple slices were studied using the FTC texture press. Sample wt. of 40, 70, 100, 130, and 160 g slices were tested and three orientations (crosswise, lengthwise and randomly) of slices in the standard shear compression cell. The max. shearing force approaches a constant when the sample wt. reaches 70 g for blanched slices. Sample wt. of 100 g for fresh slices and 100-130 g for blanched slices are suggested by these test results. Crosswise or random orientation of slices in the cell is preferred. Polynominal models of the max. force (N) versus sample wt. (g) are given and shown to be a closer fit over simple linear models. AS

Citrus fruits

828 Faid (M) and Tantaoui-Elaraki (A). Production of toxic metabolities by Penicillium italicum and P. digitatum isolated from citrus fruits. Journal of Food Protection 52(3); 1989; 194-197

Ninety-six mold isolates were obtained from naturally rotten citrus fruits. Among them, forty were identified as Penicillium italicum and twenty-four as P. digitatum. Twenty-four isolates of the former and twenty of the latter were tested for toxigenesis. They were first grown on Yeast Extract Sucrose (YES) broth for ten d at 22 C. Then, after mycelium removal, the cultures were sterilized by Millipore filtration and the toxicity of the sterile filtrates tested by four different bioassays; i.e. a bacterial test with Bacillus megaterium, a plant test with Lepidium sativum a test with the brine shrimp Artemia salina and the chick (Gallus domesticus) embryo test. In P. digitatum, 95% of the filtrates were toxic by B. megaterium, 100% caused strong inhibition of seed germination in L. sativum. 75% showed acute toxicity to the brine shrimp and 65% were toxic to the chick embryo, while the figures for P. italicum results observed with the four different tests didn't always correlate. AS

829 Kawamura (Y), Uchiyama (S) and Saito (Y). Improvement of the half-embryo test for detection of gamma irradiated grapefruit and its application to irradiated oranges and lemons. Journal of Food Science

54(6); 1989; 1501-1504

The duration of the half-embryo test used for identification of gamma irradiated grapefruit was shortened by increasing germination temp. to 35 C. Max. shooting percentages were reached within 3 days. Gibberellin application reduced the required incubation time to 2 days. Half-embryos extracted from irradiated orange and lemon gave similar results to those of grapefruit. This half-embryo test is proposed as an identification method from irradiated citrus. Assessment can be made after 3 to 4 days when shooting percentage is greater than 50%. AS

Grapes

830 Gonzalez-Lara (R), Correa (I), Polo (MC), Martin-Alvarez (PJ) and Ramos (M). Classification of variety musts by statistical analysis of their electrophoretic protein pattern. Food Chemistry 34(2); 1989; 103-110

Unsupervised classification techniques (Principal Components Analysis and Cluster Analysis) have been applied to electrophoretic analytical data from seventeen grape must samples of six different cvs. A good grouping of samples according to their cultivar has been obtained. AS

Melons

831 Teotia (MS) and Ramakrishna (P). Densities of melon seeds, kernels and hulls. Journal of Food Engineering 9(3); 1989; 231-236

In this investigation a suitable water separation tank which can be used either for batch or continuous purpose based on the density has been designed for separation of kernel and seed fractions obtained by mechanical dehulling, of the melon seeds. For this purpose true density, bulk density and apparent density of the seeds, kernels and hulls of commercial var. of muskmelon, long melon and water melon were determined and it was shown that there is a significant difference between the apparent densities of kernels and seeds. Kernels were denser than water whereas seeds were less dense there by kernels sink while seeds float in water. Based on this principle the above device was developed. NGKR

Prince melon

832 Sugiyama (J), Hayashi (T) and Horiuchi (H). Changes in electrical impedance of prince melon during ripening. Journal of the Japanese Society of Food and Nutrition '(Eiyo to Shokuryo') 36(5); 1989; 424-427

Electrical impedance of prince melons was studied for application to quality evaluation. The electrical information at only 1 cm depth from the surface of samples showed remarkable changes with ripening. Moderate correlations between some impedance parameters and maturity index were observed from the results of measurements.

It was speculated that the correlations reflected the changes in cell membrane and cell wall. However better correlation with maturity is needed to establish an impedance method for quality evaluation. AS

Oranges

833 Sugisawa (H), Yamamoto (M), Tamura (H) and Takagi (N). The comparison of volatile components in peel oil from four species of Navel orange. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 36(6); 1989; 455-462 (Ja).

The comparison of volatile components in the peel oil of Navel orange was carried out to elucidate the differences of aroma quality between closely related sp. The essential oils were prepared by simultaneous distillation-extraction, from four sp. of Navels such as Washington (Citrus sinensis Osbeck Washington), Hukumotobeni (C. sinensis Osbeck cv. Hukumotobeni), Ohmishima (C. sinensis Osbeck cv. Ohmishima), Shiroyanagi (C. sinensis Osbeck cv. Shiroyanagi), which were harvested in Shikoku, Japan. Each oil was separated into hydrocarbon and oxygenated compounds fractions through a silica gel column, and analyzed by a combined capillary gas chromatography-mass spectrometer (GC/MS). Twelve components in the hydrocarbon fraction of each peel oil were identified by GC/MS and Kovats Indices. Moreover, 68 components in Washington navel, 62 components in Hukumotobeni, 58 components in Ohmishima, 65 components in Shiroyanagi were identified as the oxygenated compounds. As these oxygenated fractions had the characteristic aroma of the peel oil, they were further separated into four fractions, and then examined by GC/MS and GC-sniffing. The character impact compound of navel orange aroma was not found, but it was suggested that floral, herbaceous and fruity components were important to Navel orange aroma and their interaction affected mainly to the characteristic aroma of Navel peel oil. AS

CONFECTIONERY, STARCH AND SUGAR

834 Rajan (KK). The properties and appeal of lactose to the confectionery and bakery industries. Confectionery Production 55(6); 1989; 417

The properties and use of lactose in bakery and confectionery products are briefly mentioned. SYR

Confectionery

835 Frampton (A). Prevention of rancidity in confectionery and biscuits. Manufacturing Confectioner 69(6); 1989; 129-136

A bird's eye view of the progress made to prevent rancidity over the last thirty yrs in a number of important areas is discussed. Care in the selection of ingredients packaging materials and processing equipment as well as it shelf-life policies affect the success of rancidity prevention in confectionery and biscuits. SYR

836 Less (R). English confectionery. Changes in traditional products. Confectionery Production 55(12); 1989; 789, 792-793

The position of confectionery industry in UK is discussed briefly. The changes in demand for traditional products and demand for health foods are briefly discussed. SYR

837 Long (TJ). Continuous production of starlight mints. Manufacturing Confectioner 69(10); 1989; 80-81

The paper briefly describes the continuous production of starlight mints by means of co-extruder. Firstly the extruder was feeding into a forming machine to make regularly striped candies. Then the extruder was moved over to feed a rope sizer and then a ball machine to produce starlight mints which then went through a candy cooler. SYR

838 Mickelberry (WC). Application of freeze-dried fruits in confectionery products. Manufacturing Confectioner 69(6); 1989; 141-143

The advantages in usage of freeze-dried fruits in confectionery products are briefly described. Their applications and usage levels and availability are discussed. SYR

839 Woodroot (JG). Peanuts in confections. Manufacturing Confectioner 69(6); 1989; 137-140

The four different types of peanuts grown in U.S., their quality differences, shelf-life, preservation are briefly described. Also the types of nuts suitable for use in various confections are mentioned. SYR

840 Yella Reddy (S) and Prabhakar (JV). Confectionery fats from sal (Shorea robusta) fat and phulwara (Madhuca butyracea) butter. Food Chemistry 34(2); 1989; 131-139

Stearins from sal fat and phulwara butter were blended in selected proportions to obtain confectionery fats or cocoa butter extenders. The sal fat stearin was obtained by removing about 20% olein from sal fat by acetone fractionation at 15 C, and the phulwara butter stearin was obtained by two-stage acetone fractionation. In the first stage of phulwara butter fractionation, a small amount of stearin (equal to 10% by wt. of butter) was removed from the phulwara butter. The resulting olein was further fractionated at 15 C to obtain stearin (yield 65% by wt. of olein). The blends containing 75-85% of sal fat stearin and 15-25% of phulwara butter stearin had solidification properties and solid fat indices close to those of cocoa butter. These blends could be used as cocoa butter extenders. Cocoa butter extenders which impart a greater cooling sensation in the mouth were prepared by decreasing the proportion of sal fat stearin to 50-67% in the blend. The blends containing 50:50, 67:33, 75:25 and 85:15% of sal fat: phulwara butter stearins were compatible with cocoa butter when admixed even at equal proportions. The tolerances of the blends towards milk fat were similar to that of cocoa butter. Thus, a series of cocoa butter extenders or confectionery fat, having a narrow melting range and melting profiles similar to those of cocoa butter could be prepared by altering the proportion of sal fat and phulwara butter stearins in the blends. AS

Candies

841 Ruffinatti (G). Batch processing of hard candy. Manufacturing Confectioner 69(10); 1989; 73-76

Automation in hard candy processing is described briefly. It can be achieved in the mixing of flavours, and colours kneading cooling pulling and transport of the product. The human intervention of handling the batches has been reduced at all stages by the use of modern machinery. SYR

842 Schluter (J). Continuous processing of hard candies. Manufacturing Confectioner 69(10); 1989; 70-71

The paper briefly summarises twenty yrs. of continuous hard candy processing. Recent developments in this area include production of sugarless and sugar substitute candies, the ability to feed multiple ropes to forming and wrapping machinery, and extrusion of multi-striped candy ropes. SYR

Chewing gum

843 Samton (HA). Recent development in the chewing gum industry. Confectionery Production 55(6); 1989; 401

The technical developments in the chewing gum industry are briefly described. These include development of new mixers, rolling machines, automatic coating drums, wrapping machines. etc. SYR

Chocolates

844 Urbanski (J). The effect of cocoa bean selection upon the characteristics of chocolate. Manufacturing Confectioner 69(6); 1989; 103-108

Some of the key factors influencing a manufactuer's selection of cocoa beans are briefly discussed. These include availability, quality price of the beans, The factors affecting flavour characteristics of cocoa beans, namely, botanical and geographical origin, farm level, harvesting practices, fermentation techniques and degree of roast. The effect of bean selection on the end product is briefly discussed. SYR

Cocoa

845 Bertimio (A) and Chiappa (O). Cocoa liquor roasting. Confectionery Production 55(6); 1989; 385-388

The advantages of cocoa liquor roasting over cocoa nibs or beans are mentioned and usage of Carle and Montanari type plant for the purpose is described. SYR

Cocoa powder

846 Pesselman (RL), Loken (RG), Hoffman (MJ) and Feit (MJ). Determination of fluoride in cocoa powder by ion-selective electrode. Journal of Food Science 54(6); 1989; 1650, 1652

A method to determine free fluoride concn. in soluble cocoa powder by a fluoride-selective electrode was developed and validated. Calibration was linear over the 0.51 to 3.03 p.p.m. range. Free fluoride ion concn. data were in the 0.52 to 1.49 p.p.m. range, with recoveries varying from 81% to 89% using a standard addition procedure. AS

Licorice

847 Kaul Gmb (H). Antisticking and glazing agents for licorice products. Confectionery Production 55(6); 1989; 406-409

This paper was given at the sugar specialities seminar. The paper describes in detail about the psychological and the technical significance of glazing and antisticking agents in confectionery. Some of the technical characteristics of a good antisticking agent include lubrication, protection against drying, antisticking effect and gloss. Some of the requirements of glazing and antisticking agents are; should polish and prevent sticking; easy to apply; must comply with food regulation and it must be stable. The types of antisticking and glazing agents and their methods of application are also discussed. SZA

Starch

848 Collins (J). Starch conditioning. Manufacturing Confectioner 69(10); 1989; 53-55

The paper describes briefly about the mechanics of the starch conditioning process. Many products demand specific conditions within the starch for satisfactory production. Two of the major conditions are moisture content and temp. Method of achieving starch conditioning include the use of contact dryers, air stream dryers and fluidized bed dryers. SYR

849 Kuppinger (H). Drying methods for moulding starch. Manufacturing Confectioner 69(10); 1989; 57-62

The paper examined different starch drying and cooling systems to determine how they can be adopted to the various kinds of moulding powder plants. Criteria to consider in the selection of starch drying process include dryer efficiency, energy, requirements and consistent product quality. SYR

850 Marousis (SN), Karathanos (VT) and Saravacos (GD). Effect of sugars on the water diffusivity in hydrated granular starches. Journal of

Food Science 54(6); 1989; 1496-1500, 1552

The effective diffusivity of water (D) in hydrated mixtures of two granular starches and three sugars (glucose, sucrose and dextrin) was investigated in the temp. range 40-100 C. Spherical samples (2-cm diameter) of the hydrated mixtures were air-dried at controlled conditions and the D values at various moistures were estimated from the slopes of the drying curves. The sugars reduced significantly the D values in proportion to their mol. size. The changes in water diffusivity were related to the porosity of the samples. Temp. had an Arrhenius-type effect, and the estimated energies of activation for diffusion of water increased significantly by the addition of sugars. AS

851 Moore (CO). Moulding starches. Manufacturing Confectioner 69(10); 1989; 47-50

The production of moulding starch, various products available and options are descussed. Quality control of moulding starches is also described. SYR

852 Pullin (GE). Starch conditioning. Manufacturing Confectioner 69(10); 1989; 63-64

To get a clean, consistently textured dry starch by the use of heat pump principle of dehumidification is described. The product is dried at a lower cost and faster. SYR

853 Sievert (D) and Pomeranz (Y). Enzyme-resistant starch. I. Characterization and evaluation by enzymatic, thermoanalytical, and microscopic methods. Cereal Chemistry 66(4); 1989; 342-347

Formation of enzyme-resistant starch (RS) during autoclaving and cooling was investigated in starches from wheat, maize, potatoes, peas, waxy maize, and amylomaize. Amylose content and yield of RS were positively correlated. The highest yield (21.3%) was obtained from amylomaize VII starch (70% amylose). Formation of RS in amylomaize VII starch was affected by the starch/water ratio, autoclaving temp., and number of autoclaving-cooling cycles. The number of cycles exerted the most pronounced effect on RS; increasing the number of cycles up to 20 raised the RS levels to over 40%. Differential scanning calorimetry thermograms of amylomaize VII preparations and isolated RS exhibited an endothermic transition over a similar temp. range (120-165 C), which could apparently be attributed to the melting of amylose crystallites. With increasing levels of RS in amylomaize VII starch preparations, a linear increase of melting enthalpies of amylomaize VII starch was recorded. Melting enthalpies of RS indicated changes in the quality of RS with increasing yields of RS. Furthermore, the thermoanalytical data suggested that amylose-lipid complexes were not involved in the formation of RS. Structural differences between heat-moisture and enzyme-treated amylomaize VII preparations, as illustrated by scanning electron microscopy, could be related to different melting enthalpies determined by differential scanning calorimetry. AS

854 Vongeheur (O). Starch conditioning. Manufacturing Confectioner 69(10); 1989; 51-52

The functions of starch conditioning are subdivided into sifting, drying, cooling and buffering. The advantages of an air flow drying or cooling unit for starch powder are mentioned. SYR

BAKERY PRODUCTS

855 Chamberlain (N). The technological need for more than one flour and bread improver in UK bakery practice. Flour Milling and Baking Research Association Bulletin 2; 1989;

The article reviews the advantage and disadvantage of improving agents in bakery, which have a particular bearing on the benifits to be gained by alternative or combined use. Covers improvers for cake flour, biscuit and pastry flour, bread flour and bread flour bleaching agents. SRA

856 Christina Rask. Thermal properties of dough and bakery products. A review of published data. Journal of Food Engineering 9(3); 1989; 167-193

This review article describes an overview of the literature on the thermal properties of dough and bakery products to facilitate the estimation of values for the properties of a product of known moisture and density. This covers bread and dough properties, the influence of temp. and moisture content, modelling of the baking process, other bakery products, density, specific heat, thermal conductivity, and thermal diffusivity etc. NGKR

857 Menzies (J). Functional dairy ingredients for the catering, pastry and baking industry. Food Technology in Australia 41(3); 1989; 647-648, 650

In this paper the discussion was to present the broad spectrum of dairy ingredients available to the food industry, and their recognised applications specifically for the catering, pastry and bakery industries. Covers caseinates, whey protein conc., total milk proteins, milk protein hydrolysates, butter products, functional milk fats, and dairy powders. SRA

858 O'Palka (J), Eidet (I) and Abbott (J). Use of sodium bicarbonate and increased liquid levels in baked products containing sour mash corn dried distillers' grains. Journal of Food Science 54(6); 1989; 1507-1510, 1514

The effect of using sodium bicarbonate as an alkalizing agent and additional liquid in oatmeal muffins containing 17%, 33%, and 40% flour replacement levels of sour mash corn DDGS was investigated. Addition of sodium carbonate improved vol. while increased liquid levels improved mouth-feel and product appearance. Consumer testing of yeast leavened dinner rolls, nut rolls, oatmeal muffin and carrot coconut breads containing sodium bicarbonate and additional liquid indicated that products were acceptable and that increased sodium levels due to sodium bicarbonate could be reduced by eliminating salt either partially or total from the formulations. AS

Bread

859 Alani (SR), Zabik (ME) and Uebersax (MA). Dry roasted pinto bean (Phaseolus vulgaris) flour in quick breads. Cereal Chemistry 66(4); 1989; 348-349

860 Qarooni (J), Wootton (M) and McMaster (G). Factors affecting the quality of Arabic bread. Additional ingredients. Journal of the Science of Food and Agriculture 48(2); 1989; 235-244

In this investigation the effect of ascrobic acid and potassium bromate, reducing agents (L-cysteine and sodium metabisulphite) emulsifiers (sodium stearoyl-2-lactylate-and sucrose fatty acid esters) and a combination of these additives on the quality of Arabic bread has been studied. The results by statistical analysis showed that the internal quality parameters of Arabic bread remarkably deteriorated by addition of ascorbic acid and potassium bromate whereas the addition of reducing agents had the advantage of reducing mixing time and improving dough sheet quality. It is found that sodium stearoyl-2-lactylate at (3g kg^{-1}) showed improvement in quality of Arabic bread especially after overnight storage whereas sucrose ester F-11 had an adverse effect on most aspects of Arabic bread quality. NGKR

Cookies

861 Hogenbirk (G). Coextruded cookies. Manufacturing Confectioner 69(10); 1989; 65-69

Factors to be considered in the manufacture of co-extruded cookies are discussed. These include equipment, dough comp., processing and ingredient, baking conditions and filling comp. The prevention of fat migration is also discussed. SYR

MILK AND DAIRY PRODUCTS

862 Goyal (GK) and Gupta (SK). Packaging of dairy products. A review. Beverage & Food World 16(1); 1989; 42-46

This review gives present status of packaging, general considerations for the selection of packages, packages of Western dairy products (table butter), flexible package for butter, recent advances, cheese, packaging requirements and flexible package for dried milk, ice cream, Indian dairy products (ghee), packaging requirement and materials for khoa and channa. 33 references. SRA

Milk

863 Payne (KD), Rico-Munuz (E) and Davidson (PM). The antimicrobial activity of phenolic compounds against Listeria monocytogenes and their effectiveness in a model milk system. Journal of Food Protection 52(3); 1989; 151-153

The min. inhibitory concn. (MIC) of several phenolic compounds against eight strains of Listeria monocytogenes in tryptose phosphate agar (TPA) was determined. Based upon concn., the most effective compound was the phenolic antioxidant tertiary butylhydroquinone (TBHQ) which had a MIC of 64 µg/ml. Among the FDA approved food antimicrobials, the most effective was propylparaben with a MIC of 512 µg/ml. Propylparaben and TBHQ were then compared to potassium sorbate, a commonly used food antimicrobial, in a model milk system containing 10% nonfat milk solids. In this study, only one strain of the test microorganisms, Scott A, was used and two levels of inoculum, 10 and 100 CFU/ml, were tested. As expected with the basic pH of the model system, both phenolic compounds were significantly more effective than potassium sorbate against L. monocytogenes at 35 C. Both compounds caused a noticeable increase in lag phase of this microorganisms. There was about a three log difference in viable cell counts between propylparaben and TBHQ and the control. The TBHQ was inconsistent in its activity. The inhibitory action of propylparaben was not affected by the level of inoculum and had consistent activity throughout testing. AS

864 Goff (HD) and Jordan (WK). Action and emulsifiers in promoting fat destabilization during the manufacture of ice cream. Journal of Dairy Science 72(1); 1989; 18-29

Several emulsifier have been examined in ice cream processing to determine their relative emulsion destabilizing power. The hydrophilic lipophilic balance value of the emulsifier did not account for all the differences in destabilization; however, destabilizing power corresponded with the resulting interfacial tension between the serum and lipid phases of the mix. Fat destabilization results from the combination of ice crystallization and shear forces during ice cream manufacture. Neither shear nor ice crystallization alone were sufficient to cause the magnitude of detabilization encountered in a typical barrel freezer. It has also been shown that polyoxyethylene sorbitan monooleate, the most powerful destabilizing agent, reduced the amount of protien adsorbed to the fat globule surface. Thus, it is suggested that, based on their ability to lower the interfacial tension, emulsifiers control the adsorption of protein to the fat globule surface. The fat globules thus become more susceptible to coalescence induced by the shear forces of agitation and ice crystalization during ice cream manufacture. AS

865 Kamei (T), Sato (J), Sugimoto (Y), Suzuki (N) and Noda (K). Study on the microbiological assay for vitamin B12 of UHT cow's milk and infant formula using Lactobacillus leichamannii. Journal of the Japanese Society of Food and Nutrition '(Eiyo to Shokuryo') 36(5); 1989; 409-416 (Ja).

Microbiological assay for vitamin B12 of UHT cow's milk and infant formula was studied using Lactobacillus leichmannii. The optimum conditions were as follows: the wavelength, pre-incubation time, initial cell concn. of test culture and incubation time were 520 nm, 5 hr, OD_{520} 0.01 and 25 hr. resp. This method could decrease the total incubation time from 32-44 to 30 hr, and was not necessary in every day's subinoculation because activity of stock culture did not be reduced even in every a month. Recoveries of vitamin B12 were in the range of 95-107%. Repeatability and reproducibility of this method were better than those of other methods. AS

866 Kanno (C). Emulsifying properties of bovine milk fat globule membrane in milk fat emulsion. Condition for the reconstitution of milk fat globules. Journal of Food Science 54(6); 1989; 1534-1539

A procedure for the reconstitution of milk fat globules (MFG) stabilized with milk fat globule membrane (MFGM) was developed. MFG was reconstituted by homogenizing a mixture of 1% MFGM and 25% milk fat at 45 C and at pH 7.0 for 1 min. The emulsifying properties of MFGM were evalauted by emulsifying activity (EA) emulsion stability (ES), whippability and foam stability. Of the variables affecting the reconstitution of MFG, prologned homogenization decreased EA and ES. About 25% milk fat gave max. EA and ES, increasing the MFGM concn. increased both EA and ES which were also influenced by the pH level. Foam disappeared at > 30 C. AS

867 Masi (P), Acierno (D) and Addeo (F). Measuring milk gelification by means of an instron universal testing machine operating in dynamic mode. Journal of Texture Studies 19(2); 1988; 161-170

This note describes a simple method to measure the kinetics of milk coagulum formation using an Instron Universal Testing Machine operating in dynamic mode. Coaxial cylinder geometry is used, applying to the internal cylinder a vertical periodical motion of 2 mm amplitude and constant speed of 1 cm/min. The flow conditions are similar to that applied in a sliding rheometer. The exp. can be equated to a periodical stress growth exp. as coagulation proceeds. Data produced according to this technique, provides information on the kinetic parameters which characterize the kinetic model currently used to describe milk coagulation. AS

868 Pouliot (Y), Boulet (M) and Paquin (P). An experimental technique for the study of milk salt balance. Journal of Dairy Science 72(1); 1989; 36-40

A new experimental device for the UF of milk at high temp. is described. The heating system permitted the holding of milk samples at high temp. from seconds to hours. UF unit equipped with a Romicon PM 50 hollow fiber UF cartridge achieved the isolation of milk permeate at temp. up to 90 C. The analysis for Ca, inorganic P, citric acid, Mg, Na, and K were made on the permeate. When compared with results from other techniques of separation, the results indicated a greater extent of salt precipitation upon heating. AS

869 Schoonderwoerd (M) and Misra (V). Detection and quantitation of pea and soy derived proteins in calf milk replacers. Journal of Dairy Science 72(1); 1989; 157-161

Commercial samples of calf milk replacers were analysed by SDS-PAGE method. It was possible to detect and determine the degree of adulteration with pea and soy protein. JSS

870 Sue Brady (M) and Katz (SE). A microbial assay system for the conformation of results of receptor assays for antibiotic residues in milk. Journal of Food Protection 52(3); 1989; 198-201

A microbial assay system has been devised as a unified conformation procedure for antibiotic residues found in milk using the Charm II receptor assay. Chlortetracycline, streptomycin, erythromycin, penicillin and chloramphenicol residues are assayed using three organisms and five types of agar. Assay specificity if achieved by making use of the differences in the antibiotics activity at selected pH's and differences in stability with regard to enzymes and temp., as well as differences in the sensitivity of the organisms to different antibiotics. The system has the flexibility to be used piecemeal when only one or two residues require conformation, or in its entirety when conformation of multiple residues is needed. AS

871 Versaw (WK), Cuppett (SL), Winters (DD) and Williams (LE). An improved colorimetric assay for bacterial lipase in nonfat dry milk. Journal of Food Science 54(6); 1989; 1557-1558, 1568

A modification of McKellar and Cholette's (1986) colorimetric method for determining lipase activity in reconstituted non-fat dry milk was developed. The method uses the colour reaction between fast blue BB and the beta-napthol (BN) enzymatically cleaved from beta-napthyl caprylate (BNC) as a measure of lipase activity. In the modified method, a solvent system is used to clarify the sample rather than extracting the coloured product. This modification allows measurement of total sample lipase by excluding centrifugation. In addition, the modified method has greater sensitivity with equal ease of use. AS

872 Ward (GM). Recent research involving the transfer of radionuclides to milk. Journal of Dairy Science 72(1); 1989; 284-287

To evaluate the radionuclide intake of people from fallout contaminated milk requires information about feed sources and milk distribution. Pasture intake and the shelf-life of milk are important factors in the case of a short lined radionuclide like I. JSS

873 Wayne (JEB) and Shoemaker (CF). Rheological characterization of commercially processed fluid milks. Journal of Texture Studies 19(2); 1988; 143-152

Flow profiles of commercially processed whole, two per cent, one per cent and non-fat milks with added solids as well as skim milk without added solids were measured using a rotational steady shear viscometer. Also tested were mixtures of concentrated skim milk added to skim milk over a range of 9.7% to 20.2% total solids. A shear rate range of 121 to 486 s^{-1} was used with a cone and plate geometry. In all cases, linear plots of shear stress versus shear rate with small non-zero intercepts were obtained. AS

Milk products

Cheese

874 Savello (PA), Ernstrom (CA) and Kalab (M). Microstructure and meltability of model process cheese made with rennet and acid casein. Journal of Dairy Science 72(1); 1989; 1-11

Experimental samples were prepared to standardisation of 39-40% moisture, 20-22% protein, 52-54% fat on dry basis, 4.5% salt on fresh wt. basis and 2.5% emulsifying salt. Undernatured or heat denatured whey proteins were added. Emulsifying salts affected the microstructure and meltability of cheese. Phosphate buffered samples were highly emulsified and poor in meltability. Citrate buffered samples were not as emulsified but melted well. Meltability decreased with increase in whey proteins. JSS

Cheddar cheese

875 Cliffe (AJ), Revell (D) and Law (BA). A method for the reverse phase high performance liquid chromatography of peptides from cheddar cheese. Food Chemistry 34(2); 1989; 147-160

A water-soluble nitrogen fraction (WSNF) was isolated from Cheddar cheese by a combination of extraction with water, methanol precipitation, removal of lipid with hexane, and permeation chromatography. The resultant product was fractionated using reverse phase fast protein liquid chromatography (FPLC). Processing of replicate cheese samples yielded final reverse phase chromatograms that were reproducible. Chemical analysis of an extract fractionated by reverse phase chromatography established that most peaks detected were either polypeptides or amino acids. The developed procedure may be suitable for carrying out time course profile studies of peptides produced during the accelerated ripening of Cheddar cheese. AS

876 Hill (AR) and Ferrier (LK). Composition and quality of Cheddar cheese. Canadian Institute of Food Science and Technology Journal 22(1); 1989; 75-79

Cheddar cheese samples aged 3-12 months were obtained from Ontario and Quebec cheese factories. A total of 73 samples were collected in two lots (38 samples collected in June, 1987 and 35 samples collected in July 1987), graded by an Agriculture Canada cheese grader using a 10 point scale and analyzed for pH, fat, moisture and salt contents. The second lot (35 samples was also analyzed for Ca, P, N content. Mean compositional values (%) and their respective coeff. of variation (%) were: moisture 34.4, 4.4; fat 33.5, 4.0; protein 24.2, 3.4; salt 1.69, 10.1; Ca 0.76, 11.8; P 0.51, 7.8. Regression analysis was used to evaluate relationships between grade scores for both texture and flavour and the following parameters; cheese pH, moisture in the non-fat substance (MNFS), salt in the moisture (SM), fat in the dry matter (FDM) Ca and P. None of the models tested were useful predictors of cheese quality. There was a weak ($r = 0.57$) but significant ($P < 0.001$) direct relationship between texture and flavour scores. SM decreased with increasing MNFS ($P < 0.001$), and MNFS correlated directly with FDM. Molar ratios of Ca to P were inversely related to Ca content. AS

877 Kwak (HS), Jeon (IJ) and Perng (SK). Statistical patterns of lipase activities on the release of short-chain fatty acids in Cheddar cheese slurries. Journal of Food Science 54(6); 1989; 1559-1564

Twenty-five commercial food grade and analytical grade lipases were used to study the patterns of release of short-chain fatty acids (FFA) from milk fat in cheese slurries. Principal component Analysis showed that there were four distinctive groups indicated by the FFA ratios and five groups indicated by the FFA concn. Average Linkage Cluster Analysis also showed similar results although the patterns of FFA released were a matter of distance defined statistically between groups of lipases. All the lipases tested had distinctive specificities in hydrolyzing short chain FFA from milk fat, and their specificities on the FFA release were reflected on the groupings. AS

Milk proteins

878 Deshmukh (AR), Donker (JD), Addis (PB) and Jenness (R). Cellulose acetate and polyacrylamide gel electrophoresis for quantification of milk protein fractions. Journal of Dairy Science 72(1); 1989; 12-17

Cellulose acetate electrophoresis and PAGE techniques were compared for fractionation and quantification of milk proteins. Protein bands were stained with Ponceau-S and aniline blue black in the cellulose acetate electrophoresis and PAGE, resp. alpha casein and beta-casein absorbed almost equal quantities of Ponceau-S per unit wt. Whereas beta-casein absorbed more aniline blue black per unit than did alpha casein. Beta-Lactoglobulin, alpha-lactalbumin, and bovine serum albumin absorbed equal amounts of Ponceau-S per unit but differed in absorption of aniline blue black. It was concluded that cellulose acetate electrophoresis was the method of choice for rapid fractionation and quantification of milk proteins. AS

MEAT AND POULTRY

879 Taguchi (T), Ishizaki (S), Tanaka (M), Nagashima (Y) and Amano (K). Effect of ultraviolet irradiation on thermal gelation of muscle

pastes. Journal of Food Science 54(6); 1989; 1438-1440, 1465

The role of the actomyosin denaturation in the thermal gelation of muscle pastes by ultraviolet (UV) irradiation was studied. The pastes and actomyosins were obtained from sardine, beef, and pork. When UV irradiation (2,700 MUW/cm^2) from a photochemical mercury-arc lamp was applied to the pastes, the surface gel strength of thermal gels markedly increased with prolonged irradiating time. The effect of UV at 360 nm on the sardine gels was superior to that at 250 nm. UV denaturation of actomyosin ATPase revealed that activation of Mg-ATPase and decrease of EDTA-ATPase occurred simultaneously. The possible role of UV irradiation in the thermal gelation was discussed from the point of actomyosin ATPase. AS

Meat

880 Bowers (JA), Craig (J) and Williams (JC). Sensory characteristics, texture, colour, and selected nutrient content of veal muscle. Journal of Food Science 54(6); 1989; 1444-1449, 1470

Effect of cooking methods, internal end-point temp. cut and type of veal on yield, sensory characteristics, colour and texture were determined. Fatty acid profiles and fat, cholesterol and iron content were also determined for selected cuts or veal. In general, veal cooked at higher temp. and to a higher end-point temp. had greater cooking losses and less moisture and was less tender. Hunter Lab colour and Instron compression values also were affected by end-point temp. Muscles from the bottom round was redder and darker in colour, contained less moisture and more fat and had a more metallic flavour than muscle from the sirloin. Bob veal was more red and contained more moisture, cholesterol and iron but less fat than special fed veal (SFV). More meaty and sour flavour was detected in SFV than in Bob veal. AS

881 Draper (AM) and Zeece (MG). Thermal stability of Cathepsin. D. Journal of Food Science 54(6); 1989; 1651-1652

The effect of pH and temp. on Cathepsin D stability was examined using a hemoglobin assay following preincubation of the enzyme at various pH and temp. combinations. The results of the study showed that the enzyme retained 87% of its activity at 45 C (pH 3.5) when compared to a control at 37 C (pH 3.5). Further increase in temp. and pH resulted in decreased enzyme activity and approx. 43% remained at 55 C (pH 5.5). The amount of activity remaining at higher temp. decreased but suggested that the enzyme could contribute to textural changes in meat at temp. up to 60 C. AS

882 Kamoun (M) and Culioli (J). Mechanical behaviour of cooked meat under sinusoidal compression. Journal of Texture Studies 19(2); 1988; 117-136

The rheological behaviour of raw meat, and of meat cooked under different conditions, has been studied with sinusoidal compression in a transient state. Meat samples underwent compression perpendicular to the myofibre axis in a cell equipped with lateral walls that made it possible to limit the free strain of samples to only one direction viz. parallel (longitudinal configuration) or perpendicular (transverse configuration) with respect to the myofibres. Both raw and cooked meat exhibit visco-elastic behaviour with a slight viscous component. Cooking meat results in both increased resistance and more elasticity. The variations in these parameters depend on the configuration and compression ratio used. With raw or slightly cooked meat, myofibrillar and connective structures can be analysed selectively in the longitudinal configuration by using compression ratios that are, resp., non-destructive and destructive. When cooking is carried out at a high temp., myofibrillar resistance can be analysed preferentially in the longitudinal configuration, and connective tissue in the transverse configuration. AS

883 Rosinki (MJ), Barmore (CR), Bridges (WCJr), Dick (RL) and Acton (JC). Phosphate type and salt concentration effect on shear strength of and packaging film adhesion to processed meat from a cook-in packaging system. Journal of Food Science 54(6); 1989; 1422-1425, 1430

Shear force values of product slices and adhesion at packaging film meat interfaces were measured for vacuum-packaged, cook-in-the-film prepared meat products. With 2.0% NaCl, phosphate addition at 0.4% increased both measures in the following order of effectiveness; sodium acid pyrophosphate > sodium tripolyphosphate > no phosphate. For NaCl effects, generally a 1% increase in concn. in the range of 0.5% to 4.0% was required to increase shear values of cooked products. Adhesion at the film-meat interface did not increase until the NaCl concn. was > 3.0%. In studying type of phosphate or NaCl concn. effects, higher adhesion occurred for packaging films having a nylon sealant layer as compared to films with sealants of Surlyn or a nylon-Surlyn blend. AS

Beef

884 Lombardi-Boccia (G) and Carnovale (E). In vitro estimation of iron availability from meals and beef. Effect of processing and fortification. Journal of Food Science 54(6); 1989; 1441-1443

The effect of meal comp., cooking, drying and fortification on in vitro iron availability from meals (50% meat, 50% vegetables) and meat was studied. Fortification was carried out with electrolytic iron powder. Unfortified samples were also studied. In fortified meals, iron availability (8.5% in raw samples) was not affected by cooking and drying processes. However, cooking and drying reduced chem. availability of iron in unfortified meals. Similar results were obtained with meat: upon cooking its iron availability showed a reduction of 26% and 4%, in unfortified and fortified samples, resp. Therefore, fortification reduced losses due to processing. Presence of vegetables (50%) reduced dialyzable iron by 35%. AS

885 Mann (TF), Reagan (JO), Lillard (DA), Campion (DR), Lyon (CE) and Miller (MF). Effects of phosphate in combination with nitrite of

Maillard reaction products upon warmed-over flavour in precooked, restructured beef chuck roasts. Journal of Food Science 54(6); 1989; 1431-1433, 1437

886 Rao (MV) and Gault (NFS). The influence of fibre-type composition and associated biochemical characteristics on the acid buffering capacities of several beef muscles. Meat Science 26(1); 1989; 5-18

887 Smith (SH), Plimpton (RFJr), Vanstavern (BD), Parrett (NA) and Ockerman (HW). Effect of pre-chill removal of kidney fat on young angus bull carcass quality and longissimus muscle tenderness. Journal of Food Science 54(6); 1989; 1434-1437

Pork

888 GigielA), Butler (F) and Hudson (B). Alternative methods of pig chilling. Meat Science 26(1); 1989; 67-83

889 Jenkisn (RK), Thayer (DW) and Hansen (TJ). Effect of low-dose irradiation and post-irradiation cooking and storage on the thiamin content of fresh pork. Journal of Food Science 54(6); 1989; 1461-1465

890 Trout (GR). Colour and bind strength of restructured pork chops. Effect of calcium carbonate and sodium alginate concentration. Journal of Food Science 54(6); 1989; 1466-1470

891 Yasuhara (A) and Shibamoto (T). Analysis of aldehydes and ketones in the headspace of heated pork fat. Journal of Food Science 54(6); 1989; 1471-1472, 1484

Products

Meat

892 Blackwell (JH) and Rickansrud (DA). Ingredient effects on the thermal inactivation of foot-and-mouth disease virus in formulated, comminuted meat products. Journal of Food Science 54(6); 1989; 1479-1484

893 Okayama (T), Yamanoue (M), Kondo (K) and Nagata (Y). Effects of ribose, xylose and arabinose on colour formation in processed meat products. Meat Science 26(1); 1989; 39-45

The effects of ribose, xylose and arabinose on colour formation of meat products processed by emulsion curing were investigated in an aqueous model system under anaerobic conditions. Ribose markedly enhanced the colour forming ability, nitrite decomposition and reducing ability, depending upon its initial concn.; and xylose and arabinose exhibited some promoting effects on them. The colour promoting effects of ribose, xylose and arabinose increased with a rise in pH, in agreement with the results for reducing ability. This suggested that the reducing ability of ribose, xylose and arabinose plays a key role in promoting colour formation of meat products in emulsion curing. AS

Frankfurters

894 Zayas (JF) and Lin (CS). Effect of the pretreatment of corn germ protein on the quality characteristics of frankfurters. Journal of Food Science 54(6); 1989; 1452-1456

The effects of methods of corn germ protein (CGP) pretreatment on the quality characteristics and storage stability of frankfurters were studied. CGP was incorporated in formulations of frankfurters as a powder, a stabilizer in a CGP-fat-water emulsion, and a stabilizer in preemulsified fatty tissue (PEFT). Incorporation of CGP and the method of CGP pretreatment did not affect meaty aroma, flavour and amino acid comp. of frankfurters. Water-holding capacity and yield of experimental products increased. The PEFT products had higher shear force values than control. Chem. tests indicated that amino N and total volatile N increased with time of storage at the same rate as for the control. AS

Ham

895 Douglass (JS), Morrow (FD), Ono (K), Ketton (JT), Vanderslice (JT), Post (RC) and Willis (BW). Impact of sodium ascorbate and sodium erythorbate used in meat processing on the vitamin B12 contents of cured ham. Journal of Food Science 54(6); 1989; 1473-1474

Effects of sodium ascorbate (Na ascorbate) and sodium erythorbate (Na erythorbate) on vitamin B12 content of cured, cooked ham were investigated. Paired hams were injected with cure solution containing no curing accelerators or with cure solution containing Na ascorbate or Na erythorbate (3.28, 6.56, 9.84 g/L). There were no differences between vitamin B12 contents of hams containing added curing accelerators and paired controls, indicating that B12 was not destroyed by either Na ascorbate or Na erythorbate. Analysis of ascorbate, dehydroascorbate, isoascorbate and dehydroisoascorbate showed ascorbate to be the only substance present in Na ascorbate-treated hams and isoascorbic acid to be the only substance present in Na erythorbate treated hams. AS

896 Zubillaga (MP) and Maerker (G). Measurement of safrole and isosafrole in ham. Journal of Food Science 54(6); 1989; 1475-1478

Hamburger

897 Chen (H), Singh (RP) and Reid (DS). Quality changes in hamburger meat during frozen storage. International Journal of Refrigeration 12(2); 1989; 88-94

Hamburger patties (fat content 13.05%) purchased from a local manufacturer were stored at five constant temp. (-5, -10, -15, -18 and -22 C) and one square wave variable (cyclical) temp. treatment for up to seven months. Three quality attributes, namely, extent of lipid autoxidation, discolouration, and decrease in water-holding capacity, were evaluated periodically. In addition I-POINT time-temp. indicators (type 2220) were attached to the meat packages and the responses of the indicators were recorded. Kinetic models were tested and kinetic parameters were determined for the changes of all three quality attributes studied. The investigation reveals that all three quality attributes are strongly time-temp. dependent. Correlations obtained between the quality parameters and the indicator response show the usefulness of these indicators in the food distribution chain. AS

Kilishi

898 Igene (IO). Lipid, fatty acid composition and storage stability of Kilishi, a sun-dried meat product. Tropical Science 28(3); 1989; 153-161

Kilishi was processed, stored for 60 wks at ambient temp. and its lipid and fatty acid comp. determined with an analysis of its oxidative stability. The total lipid content of Kilishi was 25% with the ratio of triglycerides and phospholipids being 9:1. Although the total per cent unsaturation in the triglycerides and phospholipids were 69.1 and 68.9 resp. The level of polyenoic fatty acids was significantly higher in the phospholipid (8.3%) than in the triglyceride fraction (1.4%). The proportions of saturated and dienoic fatty acids were comparable in the triglycerides and the phospholipids but the level of monoenoic fatty acids was much higher in the triglycerides (51.92%) than in the phospholipids (44.28%). Kilishi demonstrated an unusual lipid stability during storage, as measured by the thiobarbituric acid test. However, results showed that the major thiobarbituric reactive substance in the distillates of Kilishi, unlike in normal beef or chicken meat products, is not malonaldehyde but an unidentified, major peak at 435-440 nm in the visible spectrum of 400-700 nm wavelength. AS

Sausages

899 Fryer (RL) and Prusa (KJ). Sensory analysis, composition, and instron measurements of turkey-beef breakfast sausage. Poultry Science 67(7); 1988; 1075-1079

Six treatment combinations for the production of breakfast sausage from turkey dark meat (6.6% fat) and beef (15.3% fat) were evaluated: 100% turkey/0% beef; 80% turkey/20% beef; 60% turkey/40% beef; 40% turkey/60% beef; 20% turkey/80%beef; and 0% turkey/100% beef. Sausage meats and commercial sausage seasoning (1.5%) were blended in a mixer, formed into patties, and broiled to an internal temp. of 77 C. Raw and cooked fat content, cooking losses, sensory attributes, 80% Instron compression, and colour were evaluated. Fat content of the cooked sausages and total cooking losses increased as the amount of beef increased in the formulation. Tenderness and juiciness increased and Instron compression values decreased as the amount of turkey in the formulation increased. AS

Poultry

900 Dickens (JA) and Shackelford (AD). Feather-releasing forces related to stunning, scaling time, and scalding temperature. Poultry Science 67(7); 1988; 1069-1074

Factors of stunning vs. nonstunning, scalding time, and scalding temp. were studied to determine their individual effects on feather retention forces. Live birds were used as controls to determine feather retention forces as affected by flock, sex, and feather location. Forces were measured before stunning, after stunning for 20 and 120 S and after scalding for 1, 1.5, 2. and 2.5 min at scalding temp. of 52 C and 56 C. Stunning and scalding for longer times at higher temp. lowered the feather-pulling forces required. The percentage of reduction ranged from 18% after stunning, relative to the force required for nonstunned birds, to 81% after a 2.5 min, 56 C scalding, relative to the force required after scalding for 1 min at a temp. of 52 C. Processing parameters prior to picking have a definite effect on the feather-removal forces in chickens. AS

901 King (AJ), Ball (HRJr), Catignani (GL) and Swaisgood (HE). Physicochemical properties of ovalbumin and lysozyme treated with oleic acid. Journal of Food Science 54(6); 1989; 1639-1641

Results from polyacrylamide gel electrophoresis confirmed that proteins were more negatively charged in the presence of oleic acid. The electrophoretic mobility of unmodified and modified lysozyme was of opposite but similar magnitude. Critical micelle concn. (50.0 µM) of oleic acid suggested that association between the fatty acid and proteins was mostly hydrophobic. Muramidase activity of modified lysozyme and difference spectra of modified ovalbumin suggested that oleic acid was partially or totally surrounding the proteins. Improved freeze-thaw characteristics of treated egg while were attributed to greater negative charge and instability of proteins produced by oleic acid. AS

Chickens

902 Mahapatra (CM), Panda (B), Maitra (DN) and Pandey (NK). Yield, quality, composition and acceptability of meat from native and farm-bred chicken. A comparative study. Indian Journal of Animal Sciences 59(2); 1989; 1562-1564

Broilers

903 Lin (CF), Gray (JI), Asghar (A), Buckley (DJ), Booren (AM) and Flegal (CJ). Effects of dietary oils and alpha-tocopherol supplementation on lipid composition and stability of broiler meat. Journal of Food Science 54(6); 1989; 1457-1460, 1484

Broilers were fed diets containing oils of varying degrees of unsaturation, namely coconut oil, olive oil, linseed oil and partially hydrogenated soybean oil (HSBO), with and without alpha-tocopherol supplementation. The different oils significantly (P < 0.01) affected the fatty acid comp. of the neutral lipids and to a lesser extent, the fatty acid comp. of the phospholipids. Fatty acid comp., in turn, influenced the oxidative stability of the meat during refrigerated and frozen storage. Meat from broilers fed olive oil or coconut oil was consistently more stable than meat from the linseed oil group. Dietary supplementation with alpha-tocopherol significantly (P < 0.01) improved the oxidative stability of the dark and white broiler meat during refrigerated and frozen storage compared to meat from the broilers fed HSBO. AS

Turkey

904 Murphy (BD), Hasiak (RJ) and Sebranek (JG). Effect of antemortem electrical stunning of functional properties of turkey muscle. Poultry Science 67(7); 1988; 1062-1068

Muscles samples were collected from two groups of turkeys, one group eletrically stunned before exsanguination and the other group non-stunned. Sampling was done at 0, 4, 8 and 24 h postmortem. Examination of muscles samples for glycogen, pH, adenosine triphosphate (ATP), R value (ratio of inosine nucleotides to adenosine nucleotides), and extractable protein demonstrated that glycolysis was delayed by electrical stunning. Muscle myofibrils, however, showed no effect of stunning of Mg -ATPase, sulphydryls, or sodium dodecylsulphate-polyacrylamide gel electrophoresis patterns.

SEAFOODS

905 James (MA). Studies on the behaviour of salmonellae and Vibrio parahaemolyticus in refrigeration, freezing and storage of seafoods. Beverage & Food World 16(1); 1989; 34-38

Study describes the effect of low temp. conditions (refrigeration, freezing and further storage) on the initial and subsequent recovery, repair and growth of various sero-type of Salmonella and Vibio parahaemolyticus in the substrates of different fish and shellfish. The results of this study has indicated that during refrigeration, freezing and keeping at cold storage temp. at -20 C cannot be depended upon in all cases to kill completely or minimise the growth of microorganisms in seafoods. Further it is said that it is always better that the seafood products should be free of patheogenic organisms before subject to low temp. freezing and storage. SRA

Shrimps

906 Depaola (A), Perkins (BE), Harper (KP) and McPhearson (RM). Recovery of protein and microorganisms from shrimp peeler effluent. Journal of Food Science 54(6); 1989; 1660, 1662

A study was conducted to determine the quantity and quality of proteinaceous solids recoverable from mechanical shrimp peeler effluent. Solids were recovered by HCl precipitation and centrifugation. Recovery of solids from untreated effluent was 1%-2% by wt. (ca 10% protein) and was predictable by turbidity. The precipitation/centrifugation process reduced supernatant total organic nitrogen and biochemical oxygen demand approx. 50% and turbidity by over 90% compared with untreated effluent. Total aerobic plate counts (APC) of bacteria recovered from unprocessed shrimp and precipitated solids were 10^5 -10^6 CFU/g, approx. 1.5 log units greater than from peeled shrimp or untreated shrimp effluent. Total APC of bacteria recovered from clarified effluent was 3.2 x 10^{-1} CFU/mL. AS

Fish

907 Endo (K). Storage of fish at a temperature near its freezing point. Journal of the Japanese Society of Food and Nutrition '(Eiyo to Shokuryo') 36(5); 1989; 428-433

908 Oka (S), Ando (Y) and Oishi (K). Distribution of enterotoxigenic Clostridium perfringens in fish and shellfish. Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 55(1); 1989; 79-86

Distribution of enterotoxigenic Clostridium perfringens in freshwater fish and their diet, in marine fish, and in marine shellfish in the Southern part of Hokkaido was investigated. In addition, Hobbs' serotyping of isolates from these samples was performed. Enterotoxigenic strians from the samples heated at 75 C for 20 min were detected in 31.1% (19/61) of isolates from the intestinal tracts of freshwater fish, in 14.8% (8/54) of isolates from the intestinal tracts of marine fish. In addition 6.3% (4/63) of the isolates from marine shelfish were also enterotoxigenic. Of the isolates from the intestinal tracts of freshwater fish heated at 100 C for 60 min, 40.0% (2/5) were enterotoxigenic. Hobbs' serotype strains were detected in 22.1% (15/68) of isolates from the intestinal tracts of freshwater fish, in 12.5% (7/56) of isolates from the body surfaces and in 18.1% (23/127) of isolates from the intestinal tracts of marine fish, and in 9.9% (7/71) of isolates from marine shellfish. A total of 52 Hobb's serotype strains were divided into 6 serotypes and a large number of them belonged to type 16. AS

909 Veciana-Nogues (MT), Vidal-Carou (MC) and Marine-Font (A). Histamine and tyramine in preserved and semi-preserved fish products. Journal of Food Science 54(6); 1989; 1653-1655

Data were obtained on histamine and tyramine contents in 48 samples of preserved and semi-preserved Spanish fish products. Ranges of concn. for both amines were wide: from 1.35 to 219.20 mg/kg for histamine, and from 0.5 to 66.40 mg/kg for tyramine. Higher concn. were found in semi-preserved anchovies than in the rest of the samples studied: canned tuna, herring, mackerel and sardines. In semi-preserved anchovies stored at room temp. (18-22 C), histamine production was observed after 6 months. The increase in histamine was not observed in the samples stored under refrigeration (4-6 C). Tyramine did not increase at either temp. of storage. AS

Alaska Pollock

910 Akahane (Y) and Shimizu (Y). Effects of pH and sodium chloride on the water holding capacity of surimi and its gel. Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 55(10); 1989; 1827-1832

Water in Alaska Pollock surimi and its gel was categorised into types IP-A ("free water") IP-B (loose "entrapped water") and IIP (tight "entrapped water") plus IIIP (immobilized water). The max. IP-A and the min. IP-B and IIP plus IIIP were estimated in both non-salt ground and salt-ground surimi at a pH of about 5; that is, the water-holding capacity (WHC) of surimi was min. at this pH. The quantity of IP-A in salt-ground surimi at pH values below 5 was higher, compared to that in the non-salt-ground one. With the increase of pH above 5, WHC of surimi markedly increased and the quantity of IP-A decreased more in the salt-ground surimi than in the non-salt ground material. The amount of IP-A in surimi at pH 7 (pH of surimi or Kamaboko), reached a min. after the addition of 2-3% of NaCl. After heating surimi at pH between 5 and 9 at 90 C for 40 min. quantity of IP-A was found less in salt-ground surimi gels than in non-salt-ground ones. Especially small quantities of IP-A and large quantities of IP-B were determined in the salt-ground surimi gel at pH 7, the pH of kamaboko with a high WHC. SGB

911 Akahane (Y) and Shimizu (Y). Changes in the water-holding capacity of surimi caused by the addition of water and sodium chloride and by the subsequent heat treatment. Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 55(10); 1989; 1821-1826

Changes in the status of water in frozen Surimi of Alaska Pollock during grinding with water (25%) and NaCl (2.5%) and subsequent heating (90 C, 120 C) were investigated. The water in surimi was classified into three types: IP, IIP and IIIP. Type IP water, regarded as bulk-phase water increased with addition of water into thawed surimi, whereas types IIP plus IIIP water, tightly immobilised in protein network, changed little. However, the type IP water in ground surimi markedly decreased with the addition of NaCl while the other two types increased, according to the hydration of the proteins. After heating the slat-ground surimi, type IP water increased and the types IIP plus IIIP water decreased proportionately. Type IP water could be further classified into two sub-states, IP-A and IP-B, by compressing gel slices under a series of low pressures between 3 and 10 kg/cm^2. Type IP-A was regarded as "free" and IP-B as "entrapped" in gels. With the passing of heating time, IP-A water continuously increased and IP-B decreased continously although IP (IP-A plus IP-B) water changed little. The increase of IP-A water was accompanied by the apparent increment of the released water on the cut surface of specimen. The amount of IP-A from gels highly correlated with "Hardness" as measured by texturometer. SGB

912 Boer (G) and Fennema (O). Effect of mixing and moisture modification on toughening and dimethylamine formation in Alaska Pollock mince during frozen storage at -10 C. Journal of Food Science 54(6); 1989; 1524-1529

Alaska Pollock minces having reduced, normal and elevated levels of moisture were stored at -10 C for 2 and 4 wk to determine how toughening was influenced by different amount of ice in the frozen tissue. Minces containing reduced or elevated amounts of ice exhibited greater toughening than that observed in control minces. Also, some minces received an extra mixing step prior to freezing and this resulted in less toughening during storage, perhaps due to oxygen incorporated and partial inhibition of the enzyme system that converted trimethylamine oxide to dimethylamine and formaldehyde. However, among moisture-modified minces that received the same mixing treatment, development of toughening did not relate in any consistent manner with the development of dimethylamine. AS

Crayfish

913 Tanchotikul (U) and Hsieh (TC-Y). Volatile flavour components in crayfish waste. Journal of Food Science 54(6); 1989; 1515-1520

Volatile components of crayfish processing waste were analyzed by dynamic headspace/capillary gas chromatography/mass spectrometry and chromatography-coupled aroma perception analysis with simultaneous photoionization detection. One hundred seventeen compound were identified. The majority of the flavour compounds previously identified in freshly boiled crayfish tail meat and hepatopancreas also were detected in crayfish waste. Many areas in the headspace profile contained good nutty, green woody, sweet fruity and very desirable salty meaty aromas, indicating the presence of important crayfish flavour components in the samples. AS

Krills

914 Kolakowska (A). Krill lipids after frozen storage of about one year in relation to storage time before freezing. Nahrung 33(3); 1989; 241-244

Batches of krill (Euphausia superba D.) were frozen immediately after capture and after 12, 24, 48 and 84 h of storage at 3 C. Comp. of lipids (classes), amount of carotenoids, and hydroperoxide value were determined before freezing and after 11 months of storage at 27 C . Due to the pre-freezing storage, the lipolytic activity was observed to increase in the frozen krill. At the same time, susceptibility of lipids and carotenoids to oxidation decreased. Freezing the krill 24 h after capture is most effective in inhibiting lipid oxidation and carotenoid decomposition. AS

Sardines

915 Nakayama (T), Oka (T), Ooi (A) and Niwa (E). Shortening of the time required for the dialysis process of preparing restructured sardine

meat. Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 55(10); 1989; 1807-1813

Restructured sardine meat was prepared from a mixture of washed pulverized sardine meat and sardine oil by adding sodium alginate and dialysing against CaCl solution. The reduction in time of dialysis and prevention of quality deterioration in this process was attempted. The dynamic rigidity G' and dynamic loss G" were measured to monitor the rheological state of the mixture before dialysis. Jelly strength and breaking deformation of the products were measured to monitor the progress of alginate calcium reaction during the dialysis process. G' and G" values of the mixture with sardine oil and water were smaller than those of the mixture using the oil only, while the gelly strength and breaking deformation of the products with oil and water were larger than those of the products with the oil only. It was concluded that the smaller the G' and G" values were, the faster the alginate-Ca reaction proceded. In the sensory evaluation raw and cooked products with 0.8% sodium alginate, sardine oil and water were better in terms of texture than those with 2% sodium alginate, sardine oil and water. The larger breaking deformation of both raw and cooked products with 0.8% sodium alginate may be related to the better scores. SGB

916 Watabe (S), Ushio (M), Iwamoto (M), Kamal (M), Ioka (H) and Hashimoto (K). Rigor mortis progress of sardine and mackerel in association with ATP degradation and lactate accumulation. Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 55(10); 1989; 1833-1839

917 Yamamoto (Y) and Imose (K). Changes in fatty acid composition in sardines (Sardinops melanosticta with cooking and refrigerated storage. Journal of Nutritional Science and Vitaminology 35(1); 1989; 39-47

The influence of cooking and later storage in a refrigerator for 7 days on the fatty acid comp. of lipids in sardines (Sardinops melanosticta) was studied. The total lipid and triacylglycerol (TG) levels did not change and the phospholipid (PL) level decreased somewhat with cooking or during storage. The fatty acid comp. of the total lipids and TG fractions was little changed and that in the PL fractions was somewhat changed by the cooking. The comp. of the polyunsaturated fatty acids (PUFA) in lipids of sardine precooked at 100 or 170 C for 30 min changed from 42.7 to 38.3 or 33.5%, resp., for total lipids and from 51.5 to 38.4 or 37.6%, resp., for PL fractions during storage. The fatty acids in lipids from the ordinary meat of sardine was stable and those in the dark meat were extremely unstable during storage after cooking. It is concluded that the PUFA in the lipids of sardines were stable to cooking, but unstable to oxidation during storage in a refrigerator. The PUFA of lipids in the dark meat of sardine were extremely unstable to oxidation. AS

Tunas

918 Ogawa (Y). Studies on gape and heave of foodstuffs due to internal pressure during freezing. Freezing of tuna by calcium chloride brine

spray system. International Journal of Refrigeration 12(2); 1989; 95-106

The purposes of this study are to measure the internal pressure which causes gapes and heaves on the surfaces of a frozen body during CaCl immersion/spray freezing and to forestall these undue defects of frozen foodstuffs due to internal pressure. Exp. were carried out on the freezing of tuna fish. Both the temp. and the internal pressure of tuna fish were measured and recorded continuously with temp. sensors and pressure sensors during freezing. The results show that gapes and heaves were created on the surfaces of the sample tuna fish by internal pressure during freezing, and the internal pressure or the stress of the frozen body was released by a thermal equalizing process arranged during freezing. On the basis of the results of the experiments, a technique has been established, which is effective for preventing gapes or heaves in a frozen body during CaCl brine spray freezing. AS

919 Taguchi (T), Lo (JR), Tanaka (M), Nagashima (Y) and Amano (K). Thermal activation of actomyosin Mg-ATPase from ordinary and dark muscles of tuna and sardine. Journal of Food Science 54(6); 1989; 1521-1523, 1529

Changes in activities of actomyosin, acto-heavy meromyosin (actoHMM) and acto-subfragment-I (actoS-I) ATPase from tuna and sardine due to heat treatment (20, 25, 30, 35, 40 C) were compared for ordinary muscle and dark muscle. Activation of ordinary muscle actomyosin Mg-ATPases was more than doubled for tuna and tripled for Sardine by heating at 35 C, while activation of dark muscle actomyosin was not observed at any temp. The occurrence of thermal activation corresponded to a rapid loss of the EDTA-ATPase activity. Activation of hybrid actomyosins from dark and ordinary muscles was dependent upon myosin. For acto-HMM and acto-S-I thermal activation was not observed. The role of myosin tail fragments in thermal activation is discussed. AS

Products

Sausages

920 Demasi (TW), Grimes (LW), Dick (RL) and Acton (JC). Nitrosoheme pigment formation and light effects on colour properties of semidry, non-fermented and fermented sausages. Journal of Food Protection 52(3); 1989; 189-193

Development of the nitrosoheme pigment responsible for visual colour properties was studied in the preparation of cured, semidry non-fermented and fermented sausages. Colour stability of vacuum packaged sausages differing in pH was also evaluated during 6 wks of light exposure, and after 6 wks in dark storage. Total pigment conversion to nitrosoheme increased ($P < 0.05$) during 9.75 h of fermentation at 38 C. The max. pigment conversion attained upon heat processing to 60 C appeared dependent on prior nitrosoheme formation during fermentation. Judd-Hunter tristimulus coordinates of semidry sausages showed higher ($P < 0.05$) initial + a (redness) values when the pH was 4.85 or 4.65 as compared to pH 5.30 or 6.00. During 6 wks of light exposure, sausage pH, and time in display were significant factors for each colour property. By the fourth and sixth wks of light exposure, non-fermented sausages (pH 6.0) had maintained redness characteristics better than all fermented sausages (pH 5.30, 4.85 and 4.65) as shown by higher +a and lower hue anlge (Theta) values. After 6 wks of light exposure or dark storage, there were no differences ($P > 0.05$) in any colour property or nitrosoheme pigment content for non-fermented sausages. However, light exposure, as compared to dark storage, altered ($P > 0.05$) all colour properties and reduced ($P > 0.05$) the nitrosoheme pigment content for fermented sausages. AS

PROTEIN FOODS

Infant foods

921 Galdi (M), Carbone (N) and Valencia (ME). Comparison of ferric glycinate to ferrous sulphate in model infant formulas. Kinetics of vitamin losses. Journal of Food Science 54(6); 1989; 1530-1533, 1539

Ferric glycinate prooxidant properties were compared with those of ferrous sulphate in a powdered casein-based infant formula. About 60 p.p.m. of either iron source were added separately to the exp. formula. Fortified formulas were then stored at 20, 37, 45 C for 12, 9 or 7 months resp. The samples were assayed periodically during storage for vitamins A, E, B1, B2, and C evaluation. Ferric glycinate fortification yielded a 30-50% deterioration of the rate constant values of those obtained for ferrous sulphate addition. A 10-30% increase in activation energy values was also observed when ferric glycinate replaced ferrous sulphate as iron source. Results demonstrated lower perooxidant properties of iron when added to this infant formula as ferric glycinate than when ferrous sulphate was present. AS

922 Moharram (YG), Abou-Elkhier (YI) and Osman (HOA). Weaning foods based on sesame protein. Nahrung 33(3); 1989; 245-248

An attempt has been made to prepare seven weaning foods and two high-protein biscuits based on sesame protein. The evaluation of their chemical comp. amino acids, physical and sensory properties showed the successfull use of sesame flour in combination with dry skim milk and either corn or rice starch in preparing these types of food. AS

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Alcoholic beverages

Beer

923 Fenz (R) and Galensa (R). Identification of 1-o-trans- coumaroylglycerol as an indicator of maize beer. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 188(4); 1989; 314-316

The phenolic acid, derivative, 1-o-trans-p-coumaroylglycerol, which until now has not been identified in food or beverages, was isolated from milled grains of Zea mays using preparative high performance liquid chromatography. The structure was established by spectroscopic and chemical means. 1-o-trans-p-coumaroylglycerol, a major compound of the phenols in maize is suitable for detecting an addition of maize to the mash in the beer-brewing process. AS

Non-alcoholic beverages

Coffee

924 Heyden (S) and Schneider (KA). Coffee and cholesterol. Cafe-Cacao-The 33(2); 1989; 109-113

Epidemiological studies recently carried out on men or women in Western industrialized countries have not shown in a statistically significant way, a negative effect of coffee or caffeine on the serum HD cholesterol or Apo-lipoprotein A-1 and B levels. The positive effect of coffee on serum cholesterol seems to be confined to hypercholesterolemic men and women or people who drink boiled coffee. BV

925 Ogawa (M), Kamiya (C) and Iida (Y). Contents of tocopherols in coffee beans, coffee infusions and instant coffee. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 36(6); 1989; 490-494 (Ja).

Contents of tocopherols (alpha-, beta-, gamma-, and delta-Toc) in 14 kinds of green coffee beans, each of which had its own brand name, their roasted beans, infusions of those beans, and 38 kinds of instant coffee were determined by high-performance liquid chromatography . In 14 kinds of green coffee beans, total Toc of 12 kinds of them were more than 10 mg/'100g, the max. was 15.7 mg/100 g and the average was 11.9 mg/100g. The contents of alpha-Toc were 4.5 mg/100 g and the average was 3.5 mg/100 g. The contents of beta-Toc were 3.2 - 11.4 mg/100 g and the average was 8.4 mg/. 100 g. Gamma-Toc and delta-Toc were not found. Eighty-three to ninty-nine% (average 94%) of total Toc, 79 - 100% (average 91%) of alpha-Toc and 84 - 100% (average 95%) of beta-Toc were remained after roasting. The content of beta-Toc in the coffee beans was higher than alpha-Toc whose ratio was 1:2 - 3 except on whole ratio was 1:1.5. The content of total Toc in coffee infusion or instant coffee solution was 0.007 mg/100 ml. From these fact it was concluded that only 0.4 - 1.8% of Toc was infused from the roasted coffee beans. AS

926 Petaracco (M). Physico-chemical and structural characteristics of \`expresso' coffee brew. Tea and Coffee Trade Journal 161(12); 1989; 22-23, 26-27

Fruit juices

Apple juices

927 Coseteng (MY), McLellan (MR) and Downing (DL). Influence of titratable acidity and pH on intensity of sources of citric, malic, tartaric, lactic and acetic acids solutions and on the overall acceptability of imitation apple juice. Canadian Institute of Food Science and Technology Journal 22(1); 1989; 46-51

The results of this study indicated that sourness for citric, malic, tartaric and acetic acid solutions could be related to an interaction of both the titratable acidity and pH of the solution. One factor cannot be said to solely influence sourness. Different acids of equal wt. percent concn. (w/v%) and pH, elicit different levels of sourness. This difference is attributed to the unique chemical structure and property of each acid. Titratable acidity and pH levels also influence overall acceptability of imitation fruit beverages. AS

928 Van der Reit (WB), Botha (A) and Pinches (SE). The effect of dimethyldicarbonate on vegetative growth and ascospores of Byssochlamys fulva suspended in apple juice and strawberry nectar. International Journal of Food Microbiology 8(2); 1989; 95-102

The effect of dimethyldicarbonate (DMDC) on vegetative growth elements as well as ascospores of two strains of Byssochlamys fulva was investigated. Using apple juice as the suspending medium, vegetative growth was found to be sensitive to the compound at concn. of 25 to 75 mg/l; temp. had a marked influence on lethality, with treatment at higher temp. being far more lethal than low temp. treatment; ascospores were highly resistant to the compound, with no evidence of any lethal effects being found even at the highest concn. used (1 000 mg/l). An inoculated pack study, designed to stimulate the use of DMDC in fruit juices under practical conditions, was performed using commercially packaged apple juice or strawberry nectar as the suspending media. Packs, equilibrated to temp. of 10 C or 30 C, were aseptically inoculated with low numbers of either vegetative elements or ascospores and were treated with varying levels of DMDC. Mould development was monitored over a four wk period. Whereas vegetative growth was controlled at DMDC concn. of 50 to 100 mg/l at a treatment temp. of 30 C, ascospores displayed a great tolerance to the compound and survived exposure even in low numbers to high DMDC concn. AS

Citrus juices

929 Fong (CH), Hasegawa (S), Herman (Z) and Ou (P). Limonoid glucosides in commercial citrus juices. Journal of Food Science 54(6); 1989; 1505-1506

Commercial citrus juices were found to contain very high concn. of limonoid glucosides. TLC analyses showed the presence of these compounds averaging 320, 190 and 82 p.p.m. in orange, grapefruit and lemon juices, resp. The major glucoside in citrus juices was limonin 17-0-beta-D-glucopyranoside, which constituted over 50% of the total limonoid glucosides in the juices. AS

Palm juices

930 Ajayi (OA), Fakiya (EO) and Oladapo (GO). Industrial processing of palm juice and riboflavin loss. Food Chemistry 34(2); 1989; 89-94

The effect of processing or season, or exposure to atm temp. on riboflavin content of industrially bottled palm juice was studied. Losses occurred in riboflavin content throughout the processing stages but loss was more pronounced after the filtration stage. The pasteurized palm juice contained about 60% of the initial riboflavin while the riboflavin content of fermenting palm juice increased significantly ($P < 0.01$) with time of exposure. Losses occurred in pasteurized 'non-fermenting' samples similarly exposed. On the other hand, losses were not observed in pasteurized samples stored in the dark for 6 wks. Sun-inactivation may explain the significantly lower riboflavin content of samples processed in the dry compared to those processed in the rainy season. Findings from the study suggest that the nutritional value of processed palm juice may be raised if fermentation is allowed to proceed for 10 h before processing commences. Also, synthetic riboflavin may be incorporated at the pasteurization stage in non-fermenting juice. AS

Pear juices

931 Ohtani (H), Ando (K), Tonohara (K), Ohta (H), Nawa (Y) and Watanabe (A). Clarification of Japanese pear juice by inorganic membranes. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 36(6); 1989; 448-454 (Ja).

Inorganic UF membranes (mol. wt. cut off-(MWCO); 20 000 and 60 000 - 80 000 daltons) and two types of dynamic UF membranes (a pre-coat type and a self-rejecting type) were applied to clarify Japanese pear juice. The inorganic UF membrane of MWCO 60 000 - 80 000 and the dynamic UF membrane which was pre-coated by depositing Zr colloids on the surface of a ceramic support were suitable for clarification of the juice. They provided not only both high rejection ability of pectin and flux but also the similar sugar and acid contents to the commercial clear juice treated with pectinase. Separation of suspended solids in the sample juice by centrifugation caused a decrease in flux of the permeate of the dynamic UF membrane. During the clarification by the membrane, pectinase treatment of the sample juice resulted in little change in the components, but gave higher permeate flux than without pectinase treatment. AS

Soft drinks

932 Grenby (TH), Phillips (A), Desai (T) and Mistry (M). Laboratory studies of the dental properties of soft drinks. British Journal of Nutrition 62(2); 1989; 451-464

In this investigation the results of lab. studies of the dental properties of various soft drinks have been presented. Eight different drinks popular in UK market were examined by conducting demineralization exp. on hydroxylapatite, the basic component of dental enamel by detn. of calcium dissolving by atomic absorption spectroscopy and P by U.V. Visual spectrophotometry. It was found that the titrable acid gave better indication of their potential dental erosive property than their pH the demineralising effect on the hydroxylapatite of the acids already present in the soft drinks eclipsed the effect of the acid generated by oral microorganisms from the sugars present in the drinks. Out of the soft drinks studied the pure citrus juice proved the worst in dental decaying properties followed by the orange and black currant conc. after dilution to ready to drink from whereas cola and carbonated drinks showed the least demineralisation effect. ,NGKR

933 Robinson (J), Burke (V), Beaman (J), Hopkins (F) and Gracey (M). Antibacterial powdered soft drink base. A preliminary study. Food Technology in Australia 41(3); 1989; 667-670

A powdered soft drink base which is bactericidal in vitro against a strain of Escherichia coli which causes diarrhoea and produces both heat-labile and heat stable toxins is developed. The addition of saccharin or cyclamate to malic, tartaric or citric acids increased bacterial killing when compared to the effect of acids alone and bactericidal activity was greater with saccharin than with cyclamate. The combination of ascorbic acid with malic or tartaric acids also increased antibacterial activity. These effects could not be explained by changes in pH alone. Aspartame was not antimicrobial but it could be used as a sweetener, where saccharin and cyclamate are not permitted, by using the properties of the other constituents of drink base. Antibacterial soft-drink bases could be useful in reducing bacterial contamination in water of unsatisfactory microbiological quality. SRA

Tea

934 Hara (Y), Watanabe (M) and Sakaguchi (G). The fate of Clostridium botulinum spores inoculated into tea drinks. Studies on antibacterial effects of tea polyphenols. Part.I. Journal of the Japanese Society of Food and Nutrition '(Eiyo to Shokuryo') 36(5); 1989; 375-379 (Ja).

Clostridium botulinum spores (a mixture of five type A and five type B strains) were inoculated (1000 spores per ml) into canned liquid teas to see if they germinate, proliferate, or produce toxin during storage. Four kinds of canned tea drinks, i. e., brick-packed black tea (lightly sweetened type and sugar supplemented type), green tea and oolong tea, were incubated anaerobically for 3 months at 30 C after inoculation and the viable countings decreased markedly in all tea drinks but green tea. Heat treatment of the inoculated green tea for 30 min at 85 C decreased the viable spores. All viable cells were heat-stable spores. Intraperitoneal injection of these incubates affected no mouse. To identify the effective components, black tea was fractionated into the tannic and non-tannic components. The spores incubated in the tannic component did not. The above results show that the tea drinks have a certain C. botulinum spore killing effect and the effect is due to the tannic (polyphenolic) components. AS

935 Kawamura (J) and Takeo (T). Antibacterial activity of tea catechin to Streptococcus mutans. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 36(6); 1989; 463-467 (Ja).

Catechin fraction A (CF-A) containing (-)-epicatechin and (-)-epigallocatechin, fraction B (CF-B) containing (-) epicatechin gallate and () epigallocatechin gallate, CF-A and CF-B mixture (CF-mix), and (-)-epigallocatechin gallate (EGCg) were prepared from green tea by using the methods of YAYABE et al., and the antibacterial activity of catechins on the S. mutans was investigated. On the antibacterial effects of S. mutans, minimal inhibitory concn. (MIC) of CF-A, CF-B, CF-mix, and EGCg was 400 - 100, 100 - 50, 200 - 100, and 100 - 50 µg/ml, resp. MIC of chlorohexidine gluconate solution was less than 1.6 µg/ml. On the sterilization effect, an addition of 20 mg/ml of CF-B decreased the number of S. mutans from 10^7 to 10^2 after 3 min, while a chlorohexidine gluconate solution showed about 10 times higher sterilization activity. Although the antibacterial and sterilization effects of the CF-B were mild compared with those of chlorohexidine gluconate, it may be useful as a natural antibacterial reagent for a dentifrice or a mouthwash liquid etc, due to its reasonable antibacterial activity to S. mutans. AS

936 Liu (QJ), Horita (H), Haba (T), Yagi (A) and Ina (K). Flavour constituents of Chinese microbial-fermented tea Pu er Cha. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 36(6); 1989; 486-489 (Ja).

The flavour constituents of Pu er Cha, which was made from Chinese greee tea by microbial-fermentation, were analyzed by GC and GC-MS. The ether extracts of the samples have characteristic moldy odour. The main flavour constituents of them were constructed from linalool and its oxides, aliphatic aldehydes (n-hexanal, E-2-pentenal, E-2, Z-4-heptadienal etc), and ionones and its oxidising compounds (dihydroactinidiolide etc). These compounds seemed to be produced during manufacturing process such as solar drying and/or fermentation with microorganisms. AS

937 Okamoto (N) and Takeo (T). Determination of water content in Oolong tea and green tea by near infrared spectrophotometric analysis. Journal of the Japanese Society of Food and Nutrition '(Eiyo to Shokuryo') 36(5); 1989; 400-402 (Ja).

Near infrared spectrophotometer was examined to determine the water content in Oolong-tea and Green-tea. The second derivative NIR spectra Oolong tea was nearly same as the result found in Green-tea and it showed a strong absorption at 1916 nm assigned to water. Calibration curve of water content in Oolong-tea and Green-tea was made up of adsorbance values and used samples data by the method of loss on drying samples in atm. pressure. The water content of unknown tea samples was determined by NIR method with uses of these calibration curve. And these data were compared with the measure by drying method. As a result, with the use of same kind of tea's calibration curve, the NIR method could compete in terms of accuracy with drying method. But, with the uses of different kind of tea's one, the errors were large. AS

FATS AND OILS

938 Chirife (J), Vigo (MS), Gomez (RG) and Favetto (GJ). Water activity and chemical composition of mayonnaises. Journal of Food Science 54(6); 1989; 1658-1659

The chemical comp. (pH, moisture, oil, NaCl, and sugars) and water activity of commercial samples of regular and diet mayonnaises was determined. The water activity of regular mayonnaises was around 0.93 and that of diet ones was close to 0.95. The water activity of mayonnaises was largely determined by the nature and concn. of soluble compounds in the water phase (e.g., NaCl, sugars, and acetic acid). Exp. performed with mayonnaise and related oil/water emulsions demonstrated that emulsification did not contribute significantly to lowering of water activity. AS

939 Usuki (R). Oxidative deterioration of commercial fried foods containing chlorophylls. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 36(6); 1989; 475-478 (Ja).

Recently, chlorophyll-containing fried foods and vegetables snacks have been widely consumed in Japan, because their green colour provides consumers with a good image for health. It is well known that oxidative deterioration of fats and oils is greatly enhanced by light, especially in the presence of chlorophylls. In this study, the oxidative deterioration of oils extracted from commercial fried foods containing chlorophylls was investigated, and the effect of light irradiation on the deterioration of those foods was examined. The following experimental results were obtained; (1) A marked deterioration was not observed in chlorophyll-containing fried foods purches from two big supermarkets within one or two months from the production date. (2) On leaving fried snacks after unsealing at room temp. under the dark for 2 wks, autoxidation of their fatty components obviously proceeded. (3) When several vegetable snacks were irradiated by light (sun light or 15 W fluorescent light) for 2 wks, a remarkable increase of peroxide values was observed in chlorophyll-containing vegetables (kidney beans and green peas). AS

Fats

940 Adhikari (S) and Adhikari (J). Sal olein and mahua olein for direct edible use. Journal of the American Oil Chemists" Society 66(11); 1989; 1625-1630

Vegetable butter oleins are obtained as by-products during the fractionation process employed for making cocoa butter substitutes from sal and mahua. Outlets for these olein portions would not only ensure total utilization of these non-traditional oils, but would also provide an extension of edible oil supplies. The normal analytical characteristics and fatty acid comp. of the olein portions obtained from sal and mahua fats were investigated under appropriate conditions of time and temp. Sal olein was found to be rich in stearic (33.5-34.0%) and oleic acid (49.1-50.0), whereas mahua olein contained palmitic (18%), stearic (21%) and oleic (38%) acids. Projections from Schaal oven stability studies indicated that even without an antioxidant addition, the oleins could be stored for 4-5 months, and with 0.01% tertiary butyl hydroquinone, the storage life could prolonged to over one yr. Deep-fat frying exp. indicated that the oleins showed a slow build up rate of total polar material and are quite suitable for such use. AS

941 Herzing (AG). Eutectic effect of fats. Manufacturing Confectioner 69(10); 1989; 83-87

The phase diagrams of fats used in confectionery centres with diluent fats and their consequences on the eating quality are discussed. The centre fats discussed include coconut, palm kernel and their hydrogenated product, peanut oil, butter fat etc. These diagrams provide important insight into the textural and organoleptic properties of the products. The replacement of tropical fats such as lauric oils/fats with cottonseed and soybean oils is seldom possible to achieve identical edibility, machinability and texture. SYR

942 Zamora (R), Millan (F), Hidalgo (FJ), Alaiz (M), Maza (MP), Otias (JM) and Vioque (E). Interaction between the peptide glutathione and linoleic acid hydroperoxide. Nahrung 33(3); 1989; 283-288

Incubation exp. in order to study the influence of some parameters in the fluorescence products formation have been carried out. It has been observed a greater efficiency with the relation linoleic acid hydroperoxide:glutathione, 2:1 and a temp. of 37 C. The complex formed working with labelled linoleic acid has been separated in two main fractions. The first one (without radioactivity) is fluorescent with excitation and emission max. at 350 nm and 440 nm, resp. It has been confirmed that this fraction consists of complex of glutathione and short chain aldehydes. The fluorescence of the complex did not decrease by treatment with $NaBH_4$ or with pH. The NH_2 and SH groups take part in the lipid-peptide complex formation. The second, highly radioactive fraction includes free hydroperoxides and short chain hydroxy fatty acids. AS

Fatty acids

943 Rojo (JA) and Perkins (EG). Cyclic fatty acid monomer. Isolation and purification with solid phase extraction. Journal of the American Oil Chemists" Society 66(11); 1989; 1593-1595

The application of combined solid phase extraction (SPE) clean-up procedure to the isolation of a purified fraction containing all the monomeric cyclic fatty acid methyl esters is described. Extraction of the nonpolar lipid components from non-urea-adducting (NUA) filtrates is performed on a reverse phase octadecyl bonded silica minicolumn. Stepwise elution of the SPE-retained materials through silica gel using several solvents allowed the separation of a pure fraction containing the cyclic monomers than can be used for a more reliable quanitative estimation of these compounds in edible fats and oils. AS

Lipids

944 Kester (JJ) and Fennema (O). An edible film of lipids and cellulose ethers. Performance in a model frozen-food system. Journal of Food Science 54(6); 1989; 1390-1392, 1406

An edible, lipid-cellulose ether composite film was fabricated and tested as a barrier to internal moisture migration in a bicomponent food product stored under abusive conditions of frozen storage (-6.7 C for 9 wk). The product consisted of bread and a tomato based sauce; the film was situated at the interface of the two components. The film effectively retarded migration of moisture from the sauce to the bread during storage. As a consequence, desirable sensory properties that were related to stabilization of moisture gradients, as measured following cooking, were maintained significantly better ($P > 0.05$) in the presence of the film than they were in its absence. AS

945 Kester (JJ) and Fennema (O). An edible film of lipids and cellulose ethers. Barrier properties of moisture vapour transmission and structural evaluation. Journal of Food Science 54(6); 1989; 1383-1389

An edible, composite film of lipid and cellulose ethers was developed and appraised as a barrier to moisture vapour transmission. The film was comprised of a matrix of methylcellulose, hydroxypropyl methylcellulose and saturated C and C fatty acids, with a thin layer of white beeswax laminated to the surface. The edible film effectively retarded transport of moisture at water activities up to at least 0.97 and maintained good barrier properties even when the water activity on the low-humidity side of the film was relatively high. The apparent activation energy for water vapour transmission through the edibel film was 1.42 plus or minus 2.5 Kcal/mole. Electron microscopy revealed the importance of lipid morphology in determining moisture resistance lipid base films. AS

Oils

946 Anon. New technologies for augmenting edible oil supplies. Beverage & Food World 16(1); 1989; 32-33

947 Chiba (T), Takazawa (M) and Fujimoto (K). A simple method for estimating carbonyl content in peroxide coating oils. Journal of the American Oil Chemists" Society 66(11); 1989; 1588-592

In this method, peroxides, which interfere with carbonyl detn., are reduced with triphenyl phosphine prior to carbonyl detn. Carbonyl content is measured by a colorimetric 2,4-dinitrophenyl hydrazone procedure. Neither triphenyl phosphibne nor triphenyl phosphine oxide, oxidation products of triphenyl phosphine by reaction with peroxides, interfere with the measurement of carbonyl content. The method is applicable to several kinds of oxidized oils in any oxidation stage. AS

948 Guth (OJ), Aronhime (J) and Garti (N). Polymorphic transitions of mixed triglycerides, SOS, in the presence of sorbitan monostearate. Journal of the American Oil Chemists" Society 66(11); 1989; 1606-1613

The polymorphic behaviour of 1,3-distearoyl-2-oleoglycerol (SOS) has been investigated in the presence of a selected food emulsifier, sorbitan monostearate. Five polymorphs, named alpha-, Gamma-, Pseudo-, Beta-, Beta - and Beta - were crystallised and identified by both X-rays and DSC. MNK

949 Rao (SK) and Artz (WE). Effect of extrusion on lipid oxidation. Journal of Food Science 54(6); 1989; 1580-1583

To examine extrusion temp. effects on oil stability, corn meal/starch with soybean oil was extruded, frozen immediately in liquid nitrogen, freeze-dried and ground. The conjugable oxidation products (COP), oxodiene values (OV), peroxide values (PV) and conjugated dienes were determined during storage. There was an increase in COP, OV, PV, and conjugated dienes with an increase in extrusion temp. An increase in transition metal content, particularly iron, occurred with an increase in extrusion temp. Starch and soybean oil were extruded with 50 p.p.m. ferrous acetate (dry wt.) and 50 p.p.m. butylated hydroxyanisole (BHA) (oil wt.). Ferrous accetate reduced the oxidation relative to the control, which contained neither antioxidant nor iron, and relative to the sample containing BHA. AS

Artocarpus integrifolia oils

950 Daulatabad (CD) and Mirajkar (AM). Ricinoleic acid in Artocarpus integrifolia seed oil. Journal of the American Oil Chemists" Society 66(11); 1989; 1631

Seed oil of Artocarpus integrifolia syn. Artocarpus heterophyllus belonging to the Moraceae family contains a small amount of ricinoleic acid (7.2%). The identification was made on the basis of TLC, IR, NMR, MS and chemical degradation. The major components of the oil are linoleic acid (40.2%) and palmitic acid (30.2%). AS

Groundnut oils

951 Uematsu (T) and Ishii (K). Browning of peanut oil in the presence of amino acid and the properties of browned rancid oil. Journal of the Japanese Society of Food and Nutrition '(Eiyo to Shokuryo') 36(5); 1989; 395-399 (Ja).

Florisil-treated peanut oil (10 ml) was adsorbed on Whatman No. 42 filter papers with or without 10 mmol amino acid (alanine, valine and proline) and then the filter papers were incubated at 50 C for 60 days in the dark. In the presence of these amino acids, browning of peanut oil occurred along with oxidation and its intensity was the strongest with proline. However, no browning took place when only peanut oil was incubated. The iodine value of peanut oil decreased to 32 - 38 after 60 days, suggesting polymerization and degradation of the oil. And, the ratio of unsaturated fatty acid total fatty acid of the oil decreased to some extent during incubation. POV and the total carbonyl increased to reach max. after 30 days. TBA value of peanut oil alone was higher than that with the amino acids during incubation. Browned rancid oil fluoresced at 411-421 nm when excited at 338-343 nm. However, no fluorescence was detected in the rancid oil without the amino acids. AS

Rapeseed oils

952 Hawrysh (ZJ), Shand (PJ), Tokarska (B) and Lin (C). Effects of tertiary butylhydroquinone on storage stability of canola oil. II. Practical storage. Canadian Institute of Food Science and Technology Journal 22(1); 1989; 40-45

The sensory (odour and flavour), chemical (peroxide and thiobarbituric acid values) and gas liquid chromatography (GLC) characteristics of tertiary butylhydroquinone (TBHQ) treated canola oils stored in clear and amber glass bottles in the presence of light (1400 lux) for up to 16 W were determined. In addition, odour and chemical characteristics of the TBHQ treated oils in clear bottles stored in the dark for up to 16 W were determined. Chemical and GLC data indicated that TBHQ retarded oxidative changes however, this protective effect was not reflected in sensory odour and flavour scores. TBHQ may increase the storage stability of canola oil; however, the relationship between sensory and chemical/GLC data requires further study. Oils stored in clear bottles (in presence of light) had greater oxidative changes than those in amber glass bottles. Oil samples in clear bottles stored in the absence of light maintained almost unchanged high quality during the entire storage period. Therefore, to maintain oil quality, canola oil should be protected from light. AS

953 Yoshida (H) and Alexander (JC). Changes in enzymic hydrolysis in vitro of thermoxidised canola oil. Journal of the Science of Food and Agriculture 48(2); 1989; 245-248

In this study thermooxidised canola oil heated for various periods of time was fractionated to provide four classes of acylglycerol products based on polarity differences. The study revealed that after 70 h. of heating the amount of hydrolysis of the acylglycerol dimers was only about half and that for the trimers about one third that of the monomers. The higher polymers were the least hydrolysed and showed no further reaction after 5 min. The reduction in enzymic hydrolysis of isolated fractions from the thermooxidised oils indicated structural differences related to formation of polar compounds and polymerisation products. NGKR

Soybean oils

954 Boki (K), Shinoda (S) and Ohno (S). Effects of filtering through bleaching media on decrease of peroxide value of autoxidized soybean oil. Journal of Food Science 54(6); 1989; 1601-1603

The effect of filtering through bleaching media on decrease of peroxide value (PV) of autoxidized soybean oil were investigated to improve its quality. Sixteen kinds of filtering and bleaching media were employed. The standard activated clay was the most effective in decreasing the peroxides in autoxidized soybean oil. The relationships between the decrease of PV and the physical or the chemical properties of the media were examined. It was found that peroxides are reduced in proportion to the amount of acid at the highest acid strength range +1.5 to -5.6 rather than amount of acid at the lower acid strength range, total amount of acid or specific surface area of medium. AS

955 Rennie (BD) and Tanner (JW). Fatty acid composition of oil from soybean seeds grown at extreme temperatures. Journal of the American Oil Chemists" Society 66(11); 1989; 1622-1624

Temp. during seed development is known to influence the level of the various fatty acids in soybean (Glycine max L.) Merr.) oil. In order to determine the range of values that can be obtained for each fatty acid, five lines (A5, C1640, N78-2245, PI 123440 and PI 361088B) known to possess low linolenic acid (18:3) levels, one line (A6) known to possess a high stearic acid (18:0) level, and two cvs. (Century and Maple Arrow) were grown at 40/30, 28/22, and 15/12 C day/night. At 40/30 C, high oleic acid (18:1), low linoleic acid (18:2), and low linoleic acid levels were obtained that were beyond the range of levels reported for the soybean germplasm. The linolenic acid levels for A5, C1640 and N78-2245 grown at 40/30 C were below 2.0%, and are the lowest values reported for soybean oil. A6 displayed a high level of stearic acid at 28/22 and 40/30 C but displayed a relatively low level at 15/12 C. This indicate that temp. may affect the expression of the fas^{a} allele, which is responsible for high stearic acid levels in A6. The linolenic acid levels of PI 361088B and C1640, both possessing the fan allele, were the lowest for all lines grown at 15/12 C. Therefore, the fan allele is an appropriate source for the development of low linolenic acid lines adapted to cool areas. AS

SPICES AND CONDIMENTS

Essential oils

Mexican Oregano oil

956 Pino (J), Rosado (A), Baluja (R) and Borges (P). Analysis of the essential oil of Mexican oregano (Lippia graveolens HBK). Nahrung 33(3); 1989; 289-295

The comp. of the volatile oil of Mexican oregano (Lippia graveolens HBK) isolated by steam distillation was investigated by means of column chromatograph, gas chromatography and mass spectrometry. A total of 33 components were identified including 22 hydrocarbons, 4 alcohols, 4 ethers, 2 phenols and 1 ketone. Of the 33 components observed in the present study 7 were identified in Mexican oregano for the first time. AS

Spices

Dills

957 Paakkonen (K), Malmsten (T) and Hyvonen (L). Effects of drying method, packaging, and storage temperature and time on the quality of dill (Anethum graveolens L.). Journal of Food Science 54(6); 1989; 1485-1486, 1495

Sorption isotherms, colour and sensory quality of the dill herb (Anethum graveolens L.) were determined over a 2 yr period in exp. investigating the effect of packaging and storage temp. and time for air-dried and freeze-dried dill. The intensity scoring of odour and taste was significantly (P < 0.01) poorer for the dried dills than for frozen dill. Drying with heated air and the subsequent deteriorative processes essentially altered the odour and taste. In the case of freeze dried dill the storage conditions were important; when storage was at room temp. (23 C) the intensity of the odour and taste was better preserved in vacuum packages than in glass jars or paper bags. AS

SENSORY EVALUATION

958 Balaban (M), Carrillo (AR) and Kokini (JL). A computerized method to analyze the creep behaviour of viscoelastic foods. Journal of Texture Studies 19(2); 1988; 171-183

A computer-aided method was developed to simplify the analysis of creep behaviour and to determine the elasticity, the Newtonian viscosity and individual viscosities of viscoelastic foods. The method enabled the inclusion of all creep compliance data in the analysis, and reduced the analysis time from hours to minutes. The method was tested in the calculation of rheological properties of wheat flour dough. AS

959 Hutchings (JB) and Lillford (PJ). The perception of food texture. The philosophy of the breakdown path. Journal of Texture Studies 19(2); 88; 103-115

Many authors have drawn attention to the limitations of present texture testing methods. To a great extent this may be due to the assumption that the perception of the structural properties of foods is comprised of a series of single attributes. This philosophy may account for the failure of the single instrumental measurement as a reliable texture descriptor. The present paper emphasis that texture perception is a dynamic sensory monitor of changes made to a food by processes occurring in the mouth. A general three dimensional model applicable to foods is postulated with "Degree of structure", "Degree of Lubrication" and "Time" as its axes. As each food is changed in the mouth, it described its own "Breakdown Path" throughout the three dimensions. This approach is seen as the start of a general hypothesis for the physics and psychophysics of mastication. AS

960 Stevenson (JM), Seman (DL), Weatherall (IL) and Littlejohn (RP). Evaluation of vension colour by an objective method using CIELAB values. Journal of Food Science 54(6); 1989; 1661-1662

A trained colour panel was used to score both venison colour and colour acceptability for comparision with instrumental colour measurements. Panel colour scores were highly correlated with acceptability ($r = 0.97$) and could be predicted from CIE L*, a* and b* values by regression (R (adj) = 0.84). The use of a* alone explained the greatest amount of variation R (adj) = 0.78), and the inclusion of both L* and b* significantly improved the model. The use of hue angle and chroma either individually or in combination with L* did not provide better relationships. The use of L*, a*, and b* is recommended for satisfactory prediction of panel colour scores of venison with no less than three observations per sample. AS

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

Pesticides

Insecticides

961 Saroj Jain and Yadav (TD). Persistence of deltamethrin, etrimfos and malathion on different storage surfaces. Pesticides 23(11); 1989; 21-24

Persistence of emulsifiable conc. (EC) formulation of deltamethrin, etrimfos and malathion was tested 10, 50 and 150 mg a.i. M on ten different surfaces viz., glass, aluminium, black polythene, tile, painted and unpaired plywood, cement, mud filter paper and jute against 1-2 days old adults of Callosobruchus maculatus Fab., C. chinensis Linn. and C. analis Fab. Persistence of wettable powder (WP) formulation of deltamethrin (K-othrine) was also tested on these surface against the three test sp. upto storage period of 180 days. An assessment of mean gross persistency values of different insecticides on all the surfaces tested showed that deltamethrin possessed the highest persistency followed in decreasing order by malathion and etrimfos for all the test sp. The overall effectiveness of different surfaces in retaining the toxicity of different insecticides, based on mean gross persistency values, followed the order: black polythene (7992) > plywood (7708) > filter paper(6992) > aluminium (6528) > jute (6258) > glass (5910) > tile (5241) > painted plywood (4325) > cement (2857) > mud (789). WP formulation gave complete control of all the test sp. on all the surfaces till the end of experiment. AS

BIOCHEMISTRY AND NUTRITION

Biochemistry

962 Arntfield (SD), Murray (ED), Ismond (MAH) and Bernatsky (AM). Role of the thermal denaturation-aggregation relationship in determining the rheological properties of heat induced networks for ovalbumin and vicilin. Journal of Food Science 54(6); 1989; 1624-1631

Heat-induced denaturation (determined by differential scanning calorimetry plus ANS fluorescence and structure development assessed by dynamic testing) were monitored for ovalbumin and vicilin to evaluate the importance of these processes on the rheological characteristics of resulting protein networks. Protein denaturation preceded structure development, based on an increase in the storage modulus (G'). Reduction of the temp. between denaturation and aggregation through pH manipulation or inclusion of stabilizing salts lowered G' values in the resulting network. In contrast, in the presence of SDS, G' values increased with (ovalbumin) or were unrelated to (vicilin) reduced temp. differences. This demonstrated the importance of a balance of attractive and repulsive forces when examining network characteristics. AS

963 Brown (GL). A simple test for heat-damaged protein. An evaluation. Flour Milling Baking Research Association Bulletin 2; 1989;

The protein solubility test (PST) was found to be both quick (4 min) and easy to perform, with an acceptable degree of reproducibility occurring between samples. Although preliminary investigations would suggest that the degree of heat-damage calculated from the PST is unlikely to be accurate. The test has potential as an obsolute indicator of heat damage. The PST does have a limited potential for use at mill intake. SRA

964 Howard (P) and Mahoney (RR). Effect of dietary fibers on the enzymatic digestion of casein. Food Chemistry 34(2); 1989; 141-146

Pectin (P), guar gum (GG) and wheat bran (WB) all caused small reductions (greater than or equal to 15%) in the digestion of casein by trypsin and chymotrypsin. Lignin (L) and cocoa fiber caused reductions of more than 30% for both enzymes. Lower shaker speeds during digestion further reduced activity of chymotrypsin for P and GG but had no effect for WB and L. Casein digestion, as measured by a multi-enzyme assay, was reduced by 5-10% when each fiber was used at a level of 1% cocoa fiber and lignin had the most effect. The results support the concept that dietary fibers contribute to lower protein utilization in animals by decreasing intestinal proteolysis. AS

965 Kitabatake (N), Tani (Y) and Doi (E). Rheological properties of heat-induced ovalbumin gels prepared by two-step and one-step heating methods Journal of Food Science 54(6); 1989; 1632-1638

Ovalbumin gave a transparent solution, transparent gel, or opaque gel on heating at low ionic strength, but a turbid gel, or turbid suspension at high ionic strength (one-step heating). The ovalbumin solution, once heated at low ionic strength, gave a transparent gel with a second heating at high ionic strength (two-step heating). Textural parameters of hardness and adhesiveness, viscoelastic parameters from creep curves, breaking energy and water-holding capacity of these gels were measured. Transparent gels by the one- or two- step heating were firm and elastic and had high water-holding capacity. Turbid gels by one- step heating were soft and less elastic and had low water-holding capacity. The relationship between gel properties and structure was discussed. AS

966 Socorrow (M), Levy-Benshimol (A) and Tovar (J). In vitro digestibility of cereal and legume (Phaseolus vulgaris) starch by bovine, porcine and human pancreatic alpha-amylases. Effect of dietary fiber. Starch/Starke 41(2); 1989; 69-71

The effect of heat treatment and dietary fiber from whole and dehulled black bean (Phaseolus vulgaris) seeds on digestibility of various starches by bovine, porcine and human pancreatic alpha-amylases was studied. Corn, rice, wheat and black bean starch digestibility increased after heating. The degree of hydrolysis of black beans starch ranged between 56 and 83% of the values obtained for cereal starches depending on the enzyme used. Enzyme activity was: human 〉 porcine 〉 bovine regardless of the substrate employed. Dietary fiber decreased starch digestibility by porcine enzyme. This effect was more marked when whole grain fiber was used. Black bean and rice starch digestibility by human amylase was not affected by fiber, while corn and wheat starch hydrolysis was slightly inhibited. The use of the human enzyme is recommended for in vitro amylolysis assays. Attention is called on the difficulties of extrapolating results obtained with animal enzymes to humans. **AS**

TOXICOLOGY

Nil

FOOD LAWS AND REGULATIONS

Nil